MacWEEK

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Painter 2.0
Fractal refines 'natural-media' paint program

Phaser 200
Faster thermal-wax printing on plain paper

Transportable MultiDisk 150
Iomega takes on SyQuest again

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QuickDraw GX to take shot at PostScript's PDL primacy

Apple technologies to arm low-cost lasers

By Matthew Rothenberg, Robert Hess and Neil McManus

Cupertino, Calif. — Apple is preparing technology that harnesses the power of QuickDraw GX to replace PostScript on a future generation of low-cost printers.

Reportedly due next year, the software and hardware will turn QuickDraw GX, the upgrade to Apple's screen-imaging model, into a full-fledged page-description language.

The new technology reportedly will comprise:

▶ **QIF.** QuickDraw Interchange Format will let Macs convert PostScript output from applications such as Adobe Illustrator into resolution-independent QuickDraw GX code.

QuickDraw GX replaces the current QuickDraw architecture with an object-oriented model, making it easier for developers to build graphics applications with PostScript-like capabilities, such as rotating, scaling, skewing and adding transparency to images (see MacWEEK, Sept. 28, 1992).

See Printers, Page 119

Wireless weak in first Newton

By Andrew Gore

Cupertino, Calif. — The Newton personal digital assistant slated to ship this summer will offer only a limited subset of the communications capabilities required to fulfill Apple's PDA vision.

The device, a note taker expected to cost less than $1,000, will support point-to-point infrared and implement AppleTalk on its serial port. But it won't offer such futuristic connectivity features as wireless networking and collaboration.

"It would be absolutely terrific to have wireless LANs, but the infrastructure isn't there," said Burt Cummings, director of marketing for Apple's Personal Interactive Electronics division.

The first Newton won't even come with a built-in modem. Instead, Cummings said, a modem could be attached to the serial port, or a PCMCIA card modem could be plugged into the first Newton's single slot.

In fact, Cummings said, the PCMCIA slot would be the primary way to add features to early PDAs.

While Newton may not be able to send data over the airwaves, it will be able to plug into a Mac network to access a printer or act as a front end

See PIE, Page 119

PIE's PDA onslaught

MARCH
- Introduce CD-ROM player
- Announce more Newton licensees

SUMMER
- Ship CD-ROM player
- Announce publishing strategy
- Officially unveil Newton note taker
- Announce HyperCard player
- Roll out Sweet Pea

FALL
- Ship Newton note taker
- Ship first Sweet Pea

NEWSPAPER SECOND CLASS

Servers speed to CeBIT debut

Cards top NetWare in benchmark tests

By Mitch Ratcliffe

San Francisco — Apple's upcoming server system will deliver more than three times the performance of a standard Quadra 950, according to an Apple-commissioned benchmark report obtained by MacWEEK.

The company reportedly will roll out a family of products called the Apple Workgroup Servers on March 25 at the CeBIT '93 show in Hanover, Germany. The servers, which are based on existing 68040-based Macs, are slated to ship about a month later, sources said.

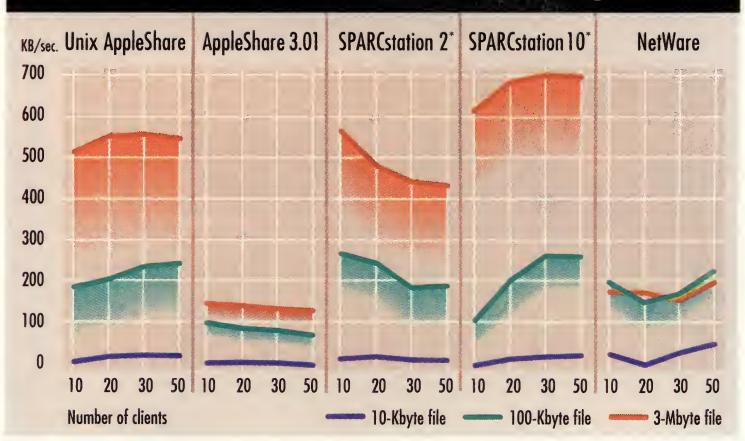
Designed to provide file and print services and database support, the server family will include three bundles for workgroups of varying sizes: a Quadra 950 with a high-performance I/O card and a Unix-based version of AppleShare, Apple's file server software; a Quadra 800 with AppleShare 4.0, a separate new version running under System 7; and a Centris 610 with AppleShare 4.0.

▶ **Workgroup Server 95.** The top-of-the-line system is based on a Quadra 950 and a processor direct slot card offering direct memory access, dual NCR 53C96 SCSI controllers and up to 512 Kbytes of cache memory. It will ship with A/UX and the new Unix AppleShare.

The Workgroup Server 95 accelerates performance by up to 350 percent compared with a stock Quadra 950 running AppleShare 3.0.1, according to the benchmark report. The data shows that the server was not significantly slower with 50 users accessing data simul-

See Server, Page 119

Apple server shines in read throughput



** Running Unix-based AppleTalk Filing Protocol-compatible server software.*

NetWare 4 not Mac-ready

By April Streeter

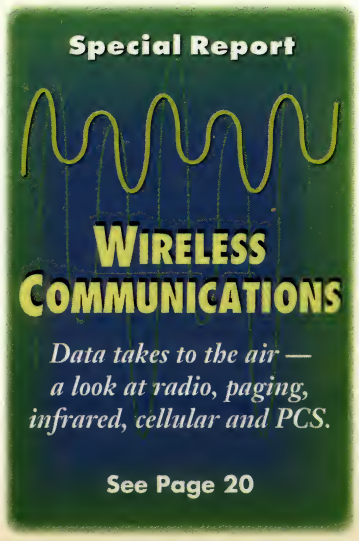
Washington — NetWare 4.0 will take center stage this week at Interop 93 Spring here, but Macintosh client improvements will be left waiting in the wings.

The major upgrade to Novell Inc.'s network operating system is the company's first pass at distributed directory services and adds the capability to create 1,000-user networks, among other improvements; it is due to ship by the end of the month. Although it isn't expected until June, users will get a peek this week at NetWare for Macintosh 4.0, an upgrade that will clear up a long-standing quirk and offer a few new features.

With NetWare for Mac 4.0, administrators need no longer worry that Mac files stored on NetWare servers will have inaccurate modification dates. This aberration, which changed the time stamps of files copied to NetWare volumes, has existed since the first Mac NLM (NetWare Loadable Module).

NetWare for Macintosh 4.0 also will allow network managers to restrict server access for individual Mac nodes based on the static addresses in Ethernet and token-ring network hardware. Previous versions could not restrict access

See Novell, Page 119



Symantec execs face felony rap in Borland case

By Mitch Ratdiffe

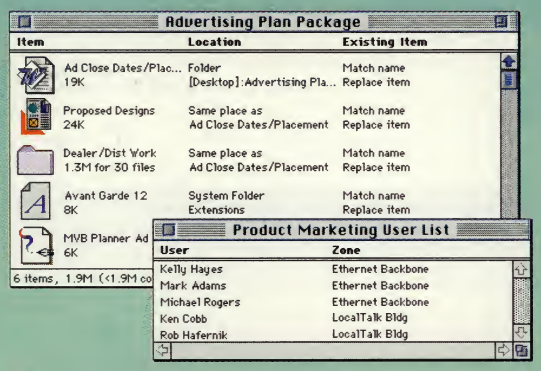
Santa Cruz, Calif. — Symantec Corp. CEO Gordon Eubanks last week was indicted on 11 felony counts for conspiracy and theft of trade secrets from rival language and applications developer Borland International Inc.

A state grand jury here handed down indictments against Eubanks, 46, and Eugene Wang, 35, a former Borland executive who joined Symantec last September (see MacWEEK, Sept. 21, 1992). Wang is charged with 21 felonies for allegedly misusing Borland computers and joining in a conspiracy with Eubanks. They were arraigned last Friday and released on their own recognizance. If convicted, each faces up to six years in jail and

See Symantec, Page 120

GIMME FIVE!

FIVE GREAT REASONS TO BUY GRACELAN UPDATE MANAGER



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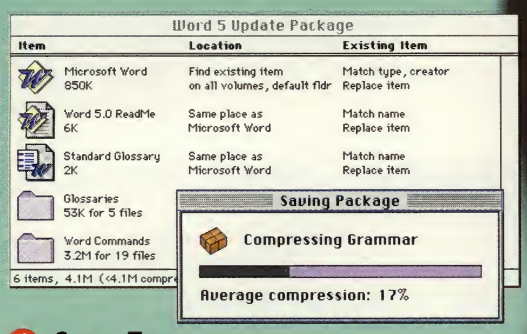

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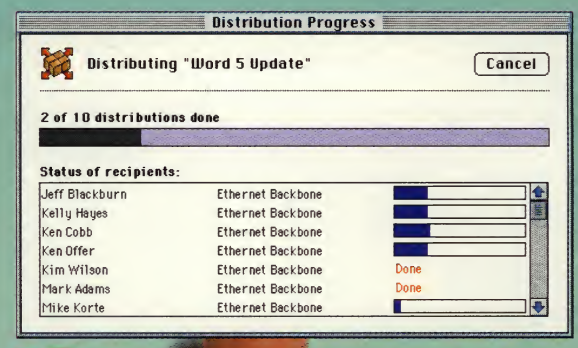

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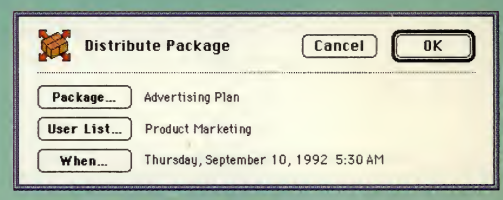

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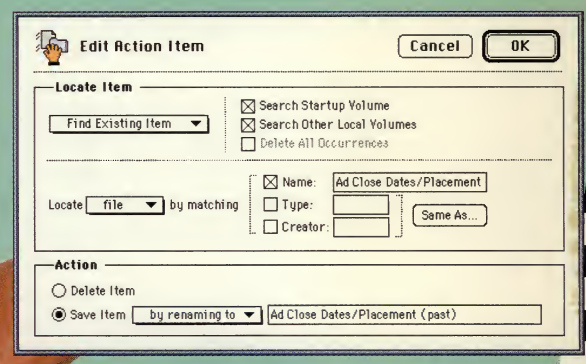

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New Mac Sound Manager to widen users' audio options

By Steve Rosenthal

San Francisco — Apple this month will release a new version of the Macintosh Sound Manager that will make it easier for users to connect to a wide range of audio input and output hardware.

The revamped system-software components, reportedly to be unveiled and shipped this month at CeBIT '93 in Hanover, Germany, will provide an open architecture for third-party audio digitizers and output systems.

As demonstrated by Apple at recent conferences, the open audio architecture will allow selection of both input and output devices via an interface similar to the Chooser or the current VDIG (video digitizer) driver selector for QuickTime video digitizers.

To take advantage of the output selection, third parties will have to write new drivers. Several developers, such as Digidesign Inc. of Menlo Park, Calif., said they already have drivers for the new architecture ready to ship with their audio hardware.

Several other expected enhancements, such as a music track in QuickTime and conversion of MIDI (Musical Instrument Digital Interface) data to sound that can be played directly from the Mac's own speakers, will be released at a later, unspecified date.

A future version of QuickTime will add a new music track that lets users send music data to the Mac's internal audio system and MIDI data out the serial port for external decoding by separate MIDI hardware. The sound track, which Apple discussed last year (see MacWEEK, March 9, 1992), may appear in QuickTime 1.6, which reportedly is set to ship by midyear.

Further down the road, a proposed new music architecture would include a general MIDI-conversion module, effectively allowing the Mac to emulate a MIDI synthesizer in software. The software would automatically use any available added hardware for better sound reproduction but could fall back to the built-in Mac audio software and hardware as necessary. No delivery date has been set, sources said. □

PowerOpen vendors organizing

By Henry Norr

Boston — Apple this week will join Motorola Inc., IBM Corp. and several other prospective PowerPC customers in forming a new organization to promote PowerOpen, the new Unix implementation IBM and Apple have been working on since forming their strategic alliance in 1991.

The PowerOpen Association Inc., according to the companies, will be "an independent organization dedicated to encouraging the broad acceptance of an open-systems standard based on the PowerOpen Environment." The group will be headquartered here.

Besides the three original alliance partners, the organization's roster will include Harris Corp., which will use PowerOpen and the PowerPC in future versions of its Night Hawk real-time systems; Thomson-CSF, a European electronics giant, which is expected to use the new operating system in defense, electronics and aerospace applications; and Tadpole Technology, which is building a PowerPC-based "notebook workstation" to be marketed by IBM.

PowerOpen will be built around a new IBM-developed Unix kernel based on the Open Software Foundation's OSF/1 standard. Apple is expected to offer a PowerOpen version of A/UX for both 680x0- and PowerPC-based Macs.

Since Apple has licensed A/UX's Mac Toolbox-emulation technology for use in IBM's PowerOpen AIX, upcoming PowerPC-based workstations from Big Blue and possibly other vendors who license its system should run off-the-shelf Mac applications as well as Unix and OS/2 software. □

Free Duo keyboard

Cupertino, Calif. — Typing too fast for your PowerBook Duo's keyboard? Apple can help with a free replacement or repair by mail or at a dealer.

Some PowerBook Duo users have reported problems in which the Shift keys or the space bar on the system's built-in keyboard do not respond when they type too rapidly. "It's usually a speed problem," said a technician who answered the Apple technical-assistance hot line.

PowerBook Duo users who experience the problem can either send in their systems for service or visit a dealer for a free keyboard replacement or repair.

The Apple technical assistance hot line is (800) 767-2775. □

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Informix takes new ViewPoint

Front ends will limit access to host data

By Mitch Ratcliffe

Menlo Park, Calif. — Informix Software Inc. this fall will ship two new products that will let Mac administrators provide their users specialized views of corporate data stored on hosts running Informix databases.

Informix-ViewPoint, a graphical user front end, and an updated version of Informix-DBA, an administrator's tool, will give users easier access to data, the company said.

Informix-DBA will let administrators build SuperViews, customized subsets of all the data stored in an Informix database. Each SuperView will include a particular set of database fields and relationships that then can be distributed to users.

Windows and Motif-compatible versions of ViewPoint also will be available; SuperViews and reports will be portable across all supported platforms.

Once SuperViews are installed in end-user Macs, users will be able to view and update all selected fields on the corporate database. For example, an accounting department would have read and write access to payroll files and home addresses of employees, but not the shipping addresses of the company's customers; shipping information would be included in SuperViews distributed to the sales and shipping departments.

ViewPoint will provide graphical forms and report builders, as well as a query-generation facility that lets users build SQL queries by entering information in a form.

Administrators can create links in SuperViews that let users display the relationship of a single record, such as a product number, to a wide variety of details, including names of all customers who have bought the product and when they paid. Informix said users previously had to perform complex programming to see these relationships.

"In the corporate environment, administrators need to help users find the information they really need," said Pete Lord, Informix product marketing manager. "SuperViews let management filter out most of the complexity in a large database."

The Windows version of ViewPoint will sell for $795; the new version of Informix-DBA will be $2,495. Prices for the Macintosh versions are not set, but the company said they will be about the same.

Informix Software Inc. is at 4100 Bohannon Drive, Menlo Park, Calif. 94025. Phone (415) 926-6300; fax (415) 926-6593. □

It's official: ClarisWorks 2.0 will ship this month

Shortcuts, outliner highlight upgrade

By Lisa Picarille

Santa Clara, Calif. — Claris Corp. last week officially announced a major upgrade to its best-selling integrated software for the Macintosh.

ClarisWorks 2.0 for the Mac, due to ship this month, offers new painting, outlining and slide-show capabilities.

The $299 product also adds a variety of enhancements, such as Shortcut buttons, which will help users work faster in all five modules by automating commonly used tasks (see MacWEEK, March 1).

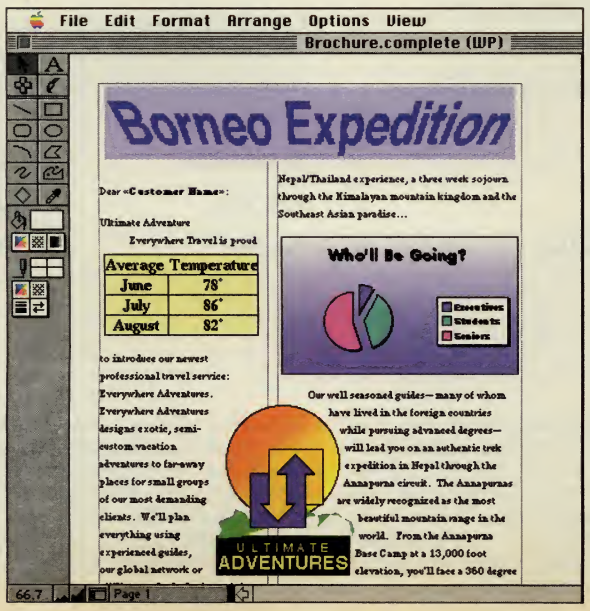
"The best thing about the upgrade is the Shortcuts," said beta-tester Kurt Thams, a partner at Pacific Coast Computing, a consulting company in Santa Cruz, Calif. "They make everything go a lot faster by eliminating separate keystrokes and mouse [selections] into a single click.

"I am also fond of the outlining features. I use [them] a lot, whereas before I had to use another program and then bring the outline into ClarisWorks."

Other beta testers praised the program's seamless integration between modules.

Upgrades are $99. Users of other Mac integrated programs, including Microsoft Works, BeagleWorks from WordPerfect Corp. and GreatWorks from Symantec Corp., can buy ClarisWorks 2.0 for $129 through Sept. 30.

Claris Corp. is at 5201 Patrick Henry Drive, P.O. Box 58168, Santa Clara, Calif. 95052-8168. Phone (408) 727-8227; fax (408) 987-3932. □



ClarisWorks 2.0 for the Macintosh, a new version of Claris' best-selling integrated package, will include painting tools that allow users to paint directly in documents. Users also now can wrap text around irregular shapes.

Conley fits '040s for Fast SCSI

By Henry Norr

New York — Conley Corp. last week added a Fast SCSI adapter for 68040-based Macs to its line of high-end storage products.

The $995 card, called the SHA-100, fits into the processor direct slot of the Centris 650 and the Quadra 800, as well as the Quadra 700, 900 and 950. Because it bypasses the NuBus and the Macs' native SCSI ports, the card can take full advantage of Fast SCSI, which supports burst transfers of 10 Mbytes per second to and from compatible drives. Even on the Quadras, the built-in SCSI ports are limited to about 4 Mbytes per second, while NuBus SCSI adapters can normally exchange data with the logic board at no more than about 6 Mbytes per second.

The SHA-100 can use system memory as a cache and read-ahead buffer. Conley's software, unlike Apple's current SCSI Manager, is asynchronous: Via such SCSI features as disconnect/reconnect and tagged-command queuing, I/O operations can take place without tying up the Mac CPU.

The card lets users choose between standard, single-ended SCSI and differential mode, which allows bus lengths of up to 82 feet. Up to six SHA-100-equipped Macs can share the same drive; each Mac gets its own partition and can mount the other partitions in read-only mode. The software also supports multiple logical unit numbers, a SCSI feature, used primarily in arrays, that allows several drives to share a single SCSI ID.

Conley, formed last August by managers and engineers formerly employed by Loviél Inc. of Edina, Minn., also offers fault-tolerant Fast and Wide SCSI disk arrays with capacities of up to 78 Gbytes.

Conley Corp. is at 16 W. 22nd St., 11th Floor, New York, N.Y. 10019. Phone (212) 979-8824; fax (212) 741-9296. □

VideoLabs' FlexCam to bring new angle to desktop video

By Lisa Picarille

Bloomington, Minn. — VideoLabs Inc. is readying a 4.2-pound gooseneck device designed to replace camcorders in video teleconferencing and desktop video applications.

FlexCam, due next month for $595, consists of a color CCD (charge-coupled device) camera and two microphones. It delivers stereo audio and NTSC video output, suitable for connection to video-capture cards, videocassette recorders and videoconferencing systems.

FlexCam's camera is mounted on an 18-inch gooseneck arm so it can be positioned easily at any angle without requiring a large amount of desk space. Other video sources used in teleconferencing, such as camcorders, typically require the camera to be mounted on top of the monitor.

The camera, which uses the reassembled mechanism from a Sony video camera, captures half-size video images but interpolates them to a 510-by-492-pixel window on the Mac, adding and averaging pixels to compensate for differences.

Users can focus the camera on elements less than 1 inch in size and have them displayed across the entire Mac screen. For example, users could focus on detailed portions of a printed document during a videoconference.

FlexCam's unique design offers a trim alternative to traditional video cameras for use in video teleconferencing.

The company said a patent is pending on the device. It also offers a PAL (European) version.

VideoLabs Inc. is at 5270 W. 84th St., Suite 120, Bloomington, Minn. 55437. Phone (612) 897-1995; fax (612) 897-3597. □

ITC upholds tariff on Japanese screens

By Jon Swartz

Washington — The International Trade Commission last week upheld a 62.7 percent tariff on imported Japanese-made active-matrix displays but ruled that a second type of flat panel imported from Japan should not be a target of tariffs.

Apple's PowerBook 180 is the only Mac system based on the screens. To get around the punitive tariff, Apple builds the systems offshore, as screens built into already-assembled computers are not subject to the levy.

Last week's ITC decision goes to the U.S. Court of International Trade in New York for further review.

Apple officials called the ITC decision "beyond belief" and vowed that the 18-month-old battle over screen tariffs was far from over.

"The whole thing is bizarre," said Jim Burger, director of government law for Apple. "If there was just one American company making active-matrix screens that said it was being hurt by the [imports], at least there would be an argument to make for [the tariff]."

The federal agency's second finding would lift a 7 percent levy on electroluminescent displays. □

WE'VE JUST LAPPED CLARIS.®

Canvas™ has never been shy about its reputation for running circles around MacDraw® Pro. But even we are stunned by just how wide the performance gap has grown. Over the last couple years, while the competition's been idling, Canvas has been pouring it on. Winning converts by the thousand. And accumulating a trophy case full of top industry awards, including two MacUser 5-Mice Ratings (no other drawing program's received even one). One look at the feature differences, and you'll understand why. Canvas offers vastly more powerful text handling tools like binding to curves, shape wrapping, full kerning control, and font-to-Bézier conversion. Unrivaled technical drawing features like auto dimensioning, parallel lines and curves, and a SmartMouse™ drawing aid. Plus sophisticated design/illustration capabilities, including object combinations and object blends. Best of all, only Canvas is self-upgrading. Our exclusive Open Architecture allows you to totally customize your work environment — turning existing tools on and off at will, and "plugging in" a steady stream of brand new ones (like our red-hot Design, Imaging, and Utility ToolPAKS™) by simply dragging them into a designated folder. Here's what MacWeek had to say about this feature in their January '93 review of Canvas: "Being able to add more than 40 tools to a program simply by copying files into a folder adds remarkable power to that program. In Canvas' case, it reinforces its position as the best object-oriented drawing program money can buy." So if you're on the fence about which program to buy, or tired of being stuck in low gear with the one you bought, just get ahold of Canvas. And you'll never look back.

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MapGrafix integrates bit maps

New faster version supports System 7.1

By Raines Cohen

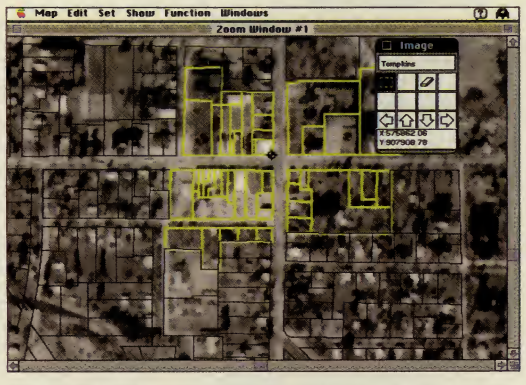
Clearwater, Fla. — ComGrafix Inc. is mapping out the future of its MapGrafix high-end mapping system, adding features, speeding others and taking advantage of System 7.1.

The company this month shipped MapGrafix 3.0, still priced at $4,995. Enhancements include:

▶ **Raster image support.** Scanned drawings, aerial photographs or satellite images can be incorporated into existing vector maps or used as backdrops for creating new ones.

"I can scan in a raster image and then digitize it directly in the program itself without having to use a graphics tablet," said Larry Gerkin, geologist at Masera Oil Corp. of Tulsa, Okla., an oil-exploration company that resells MapGrafix along with maps it creates.

▶ **Performance.** Version 3.0 updates the screen faster than before, and the Build Polygon command runs eight to 10 times faster than it did in earlier versions, the company said. "On the old version, I would have had to run it over a weekend [to translate rock shapes into a network of lines with the Build Polygon command]," Gerkin said. "Now I can usually run most of them overnight. It helps me get back to work sooner, and the boss generally likes that, at least around here."



MapGrafix 3.0 lets users import a raster image, like this aerial photo, for display behind the program's vector-based maps.

▶ **Buttons.** Users can now add hypertext links between maps. "If I want to study an area in detail, I can make a separate map at a much larger scale and set buttons within the area to zoom to the larger-scale map instead of having to switch files manually," Gerkin said.

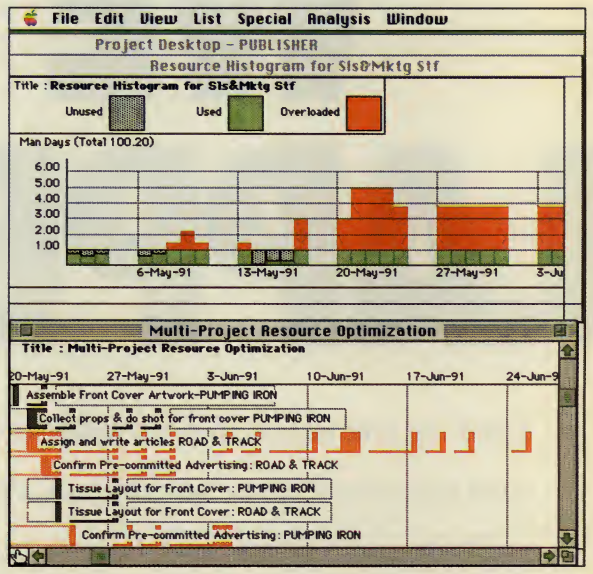
▶ **Apple events.** Version 3.0 supports custom and core Apple events, so other programs and scripting systems can control the program and create, modify or delete map elements as well as layers and graphics attributes. The program can be customized by the addition of HyperCard external commands (XCMDs).

▶ **Input and output.** The new version can print to any QuickDraw device. Raster and vector data can be printed to a LaserWriter. Version 3.0 also enhances export functions and adds support for TrueType.

Also added are new editing tools and enhanced map-display functions, plus WorldScript support.

MapGrafix users can upgrade free if they subscribe to the support program, which costs $500 per year.

ComGrafix Inc. is at 620 E St., Clearwater, Fla. 34616. Phone (813) 443-6807; fax (813) 443-7585. □



Micro Planner Manager 1.1 adds Multi-Project Resource Leveling, which allows users to manage multiple projects that are vying for the same set of resources.

Micro Planner gets task splitting, optimization for multiple projects

By Lisa Picarille

Denver — Users will be able to optimize resources over multiple projects with Version 1.1 of Micro Planner Manager, due next month from Micro Planning International Inc.

The upgrade will let users merge multiple project files into one master file; managers then can treat all the projects as if they were one large project competing for limited resources.

Micro Planner 1.1, still priced at $695, will also add task splitting, which lets users interrupt a task so that a scarce resource can be temporarily assigned to a more critical task.

Micro Planner uses an internal Project Desktop, which resembles the Mac desktop, as a work space for managing as many as five subprojects, generating reports and creating charts. The program provides four types of resource analysis, allowing managers to model numerous alternative scenarios.

Rival project-management programs Microsoft Project ($695) and Claris Corp.'s MacProject Pro ($599) already offer resource optimization on a single project. Microsoft Project also offers task splitting, although MacProject Pro does not.

Both features are incorporated in Micro Planner's higher-end sibling, the $1,995 X-Pert package, which is designed for users who shepherd numerous projects. Micro Planning also offers KeyPlan, a $395 package for users who submit proposals.

Micro Planner users will be able to upgrade for $49.

Micro Planning International Inc. is at 3801 E. Florida Ave., Suite 601, Denver, Colo. 80201. Phone (303) 757-2216; fax (303) 757-2047. □

Bechtel gives users Edge in document generation

By Kirsten L. Parkinson

San Francisco — A $20,000 system from Bechtel Software Inc. lets in-house programmers create templates from which users can automatically generate complex documents.

The Edge, based on an expert system developed by Bechtel, incorporates a modeling mode that programmers can use to design templates for different types of documents, such as contracts, licenses and reports. The templates include information about the style and format of a document, a database of text that might be included, and logic instructions for how and when text is to be inserted.

To generate a document from a model, The Edge asks users questions about the information to be included. For example, a model for a field sampling plan for a toxic-waste site might ask for the name of the site to be inspected and the types of soil or plant samples to be collected.

Users can type in answers or select them from preprogrammed menus. Buttons in the data-entry dialog boxes also let users enter comments or view information about why a question is being asked and which parts of the document will be affected by the answer they choose.

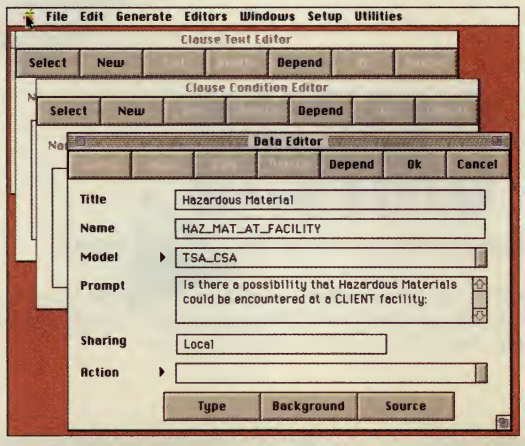
The program then creates a document based on a user's answers. As a document is generated, The Edge automatically compiles the required text; numbers and cross-references sections; and performs any needed numerical calculations. The Edge then exports the completed document to a word processing program, such as Microsoft Word or WordPerfect, using Word for Word translators from Mastersoft Inc.

"The key advantage is data consistency throughout all of the documents," said Evelyn Labbate, an applications developer at Computer Science Corp. of Eatontown, N.J. "In the past, the mode was the old cut and paste, and there was no type of configuration control over these documents. Now, editing a document produced with The Edge can be down to changing a word or two to make sure it's more grammatically correct."

The Edge's $20,000 price includes one modeling mode license and five document-generation licenses, onsite training (not including travel expenses), and one year of support.

The program requires a Mac with 5 Mbytes of RAM and virtual memory running System 7 and Oracle Corp.'s Oracle databases. A Windows version is also available, and a model created on either a Mac or IBM PC or compatible can generate documents on both platforms.

Bechtel Software Inc. is at 50 Beale St., San Francisco, Calif. 94105. Phone (415) 768-0352; fax (415) 768-1664. □



The Edge's modeling mode lets programmers set up complex logic instructions that will help users automatically generate reports, contracts and other documents.

Upgradable SIMMs let users add rather than replace RAM

By Carolyn Said

Irvine, Calif. — A new series of 8-Mbyte SIMMs from Kelly Micro Systems Inc. will give users the option of doubling the modules' capacity later, but buyers will pay a price for the extra flexibility.

Kelly's 8-Mbyte SIMMs, sold in groups of four, can be augmented by snapping on four 8-Mbyte daughtercards for a total of 64 Mbytes. The company offers four base SIMMs and daughtercards at a list price of $2,500, or about $78 per megabyte. A bundle of four 8-Mbyte base SIMMs with four 8-Mbyte daughtercard SIMMs is $4,500, or about $70 per megabyte.

Mail-order and discount suppliers now offer most kinds of standard Mac SIMMs for between $30 and $50 per megabyte. Users who have filled their SIMM slots and want to increase memory normally would have to replace existing SIMMs with higher-capacity modules.

Kelly's upgradable SIMMs work in all Macs that accept 8-Mbyte configurations and 36-pin SIMMs — the IIci, IIsi, IIvi, IIvx, Quadra 700 and Quadra 900, as well as some third-party accelerator cards. The company said it prefers that the upgrading be done by dealers, but technically adept users should be able to do it themselves.

Kelly Micro Systems Inc. is at 25 Musick, Irvine, Calif. 92718. Phone (714) 859-3900 or (800) 350-3900; fax (714) 859-6933. □

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The GatorBox EX is easy to configure and manage from any Macintosh on the network, thanks to our GatorKeeper™ software. And, along with customer support that is second to none, it provides the kind of reliability, performance and functionality you have grown to expect from Cayman Systems.

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Apple an
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Introducing the LaserWriter® Pro 600 and 630 printers from Apple.

Never before have workgroup printers this affordable produced this level of output.

Offering you true 600-dot-per-inch resolution, they deliver more than four times the definition of comparably priced 300-dpi printers.

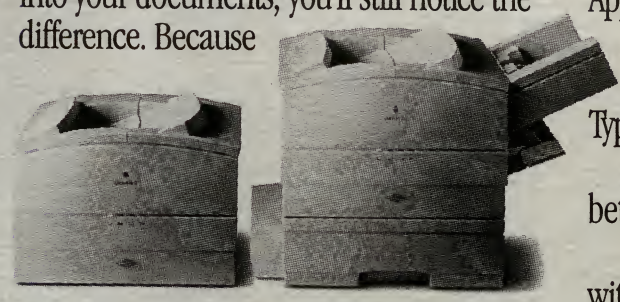
The LaserWriter Pro 600 and 630 feature PhotoGrade, an Apple breakthrough allowing you to print up to 91 levels of gray – that's 35% more grays than with our award-winning LaserWriter IIg.

Both models incorporate an Apple breakthrough in gray-scale printing called PhotoGrade.™ A process that intelligently adjusts the size and position of every dot in relation to neighboring dots, allowing you to print up to 91 levels of gray at 300 dpi.

That's equivalent to a 1,000-dpi printer costing mountains more.

The result is noticeably sharper details and the ability to reproduce the subtle tones of gray in black-and-white photographs.

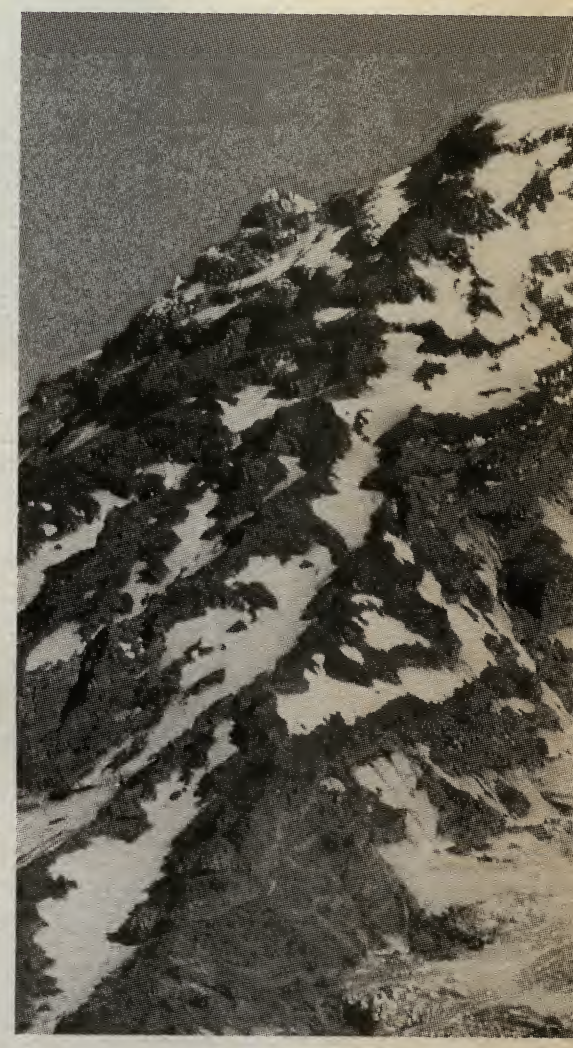
But even when you don't integrate photos into your documents, you'll still notice the difference. Because Apple's FinePrint™ technology gives your text and line art cleaner edges and smoother curves. So your TrueType™ and PostScript™ Type One fonts have never had more impact.



Both LaserWriter Pro models come with two paper trays and a host of paper-handling options, including a 500-sheet feeder and a 75-envelope feeder.

Any way you look at it, your work looks better coming out of a LaserWriter Pro.

Two paper trays come standard, along with an array of options including a 500-sheet feeder and a 75-envelope feeder for a total paper-handling capacity of 850 sheets.



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nounces of laser printing.

able to move even the largest, most complicated image files and print them at speeds rivaling any RISC-based printer.

And if you happen to work in a mixed environment, both LaserWriter Pro models fit right in. They support PCL page description language and can easily accept jobs from Macintosh® and Windows-equipped computers simultaneously.

They also provide you with something that no other printer in the world can: Apple's renowned plug-and-play simplicity.

LaserWriter Pro 630 vs. HP LaserJet 4M		
Price:	$2,529†	$2,999†
Gray levels:	91	51
Macintosh fonts:	64 TrueType 35 PostScript	None 35 PostScript
PPM:	8	8
Ethernet:	Built in	Optional
RAM:	8MB	6MB

You can also select and switch paper trays right from your computer and print a letter, complete with second sheet and envelope, without ever leaving your desk.

No other printer in the industry allows you to do so much so easily for so little.

For high-performance networks, the 630 features built-in Ethernet. So you'll be

In fact, Apple® LaserWriter printers were recently ranked highest in Overall Laser Printer Customer Satisfaction by J.D. Power and Associates.* Outranking Hewlett-Packard.

To see why, visit your authorized Apple reseller for a full demonstration.

You'll find that the LaserWriter Pro has the power to elevate your work to a level ordinary printers can only aspire to.

The power not just to look your best. The power to be your best.®

The new LaserWriter Pro series from Apple.

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Connect PCs to your AppleTalk network!

COPS LT-I and LT-M LocalTalk interface cards for the PC (formerly the DayStar Digital LT-200 cards).

COPSTalk for DOS provides access (through a Chooser-type utility) to AppleTalk PostScript printers and file servers (including AppleShare, System 7 File Sharing, and COPS' EasyServer).

COPSTalk for Windows includes a number of productivity-enhancing features:

- Faster printing than other products.
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- Print to first available printer in a group.
- PostScript font and file downloader.

COPS' AppleTalk client software works with EtherTalk or LocalTalk using the COPS LocalTalk cards or Ethernet cards from 3Com, Western Digital/ SMC, Novell, Asante, etc.

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COPS EasyServer AFP file server

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PServe 3.0 PostScript print server

- highest rated print server by MacUser[1]
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**According to MacWEEK, July 13, 1992*
[1]See MacUser, October 1992

MedVision Viewer can access CIT, MRI, PET images for display

By Raines Cohen

Gaithersburg, Md. — Evergreen Technologies Inc. this month shipped MedVision Viewer, an application for displaying medical images.

The $695 program, available for both the Mac and Windows, is compatible with files created by the company's MedVision imaging software.

MedVision Modality Pak, priced at $895, can acquire computer-aided tomography (CIT), magnetic resonance imaging (MRI), PET and SPECT images from medical scanners and process them into a standard file format, as well as perform image analysis.

Evergreen's MedVision Viewer can display multiple images from several sources at once, individually selecting slices from a series of images.

The Viewer can access image databases stored on CD-ROM as well as standardized Picture Archival and Communications Systems used by some medical facilities. Multiple images can be viewed simultaneously to facilitate diagnosis.

"Our cardiologists will use MedVision Viewer as an easy way to access and read cardiac nuclear images," said David Tomberlin, head nuclear technologist at Southwestern Medical Center in Lawton, Okla. "Previously, they had to use the scanner console, which was not always possible. This is a real timesaver."

Mike Aque, program analyst at Allegheny Neuropsychiatric Institute of Oakdale, Pa., said: "We have both MedVision and MedVision Viewer. We [use the Viewer to] look at MRI images. It's a lot better than doing it directly on the MRI machine, where you can view only one image at a time. It's much easier to pick out the image that you actually want to look at."

Evergreen Technologies Inc. is at 849-M Quince Orchard Blvd., Gaithersburg, Md. 20878. Phone (301) 948-1800; fax (301) 990-6844. □

Kubik jukebox spins up 240 CDs on four drives

By April Streeter

Richmond, British Columbia — A jukebox due this summer from Kubik Technologies Ltd. will store up to 240 CD-ROMs for automatic access from networked Macs, Unix workstations and IBM PCs and compatibles.

The Kubik 240 Disc CD-ROM Changer will ship with the user's choice of one to four internal Toshiba-mechanism CD-ROM drives.

A long arm inside the Changer moves selected discs to a caddy and then to one of the four drives. Kubik will supply a driver that allows Mac applications to control the Changer, but no end-user control software.

According to Kubik, the Changer's average disc access time is between seven and 12 seconds.

With a single drive, the Changer will be priced at $8,000; with four drives it will cost $20,000.

The company said the Changer is intended for use at libraries and other installations requiring centralized storage of CD-ROMs.

Kubik Technologies Ltd. is at 13120 Vanier Place, Suite 110, Richmond, British Columbia V6V 2J2, Canada. Phone (604) 273-0400; fax (604) 273-7237. □

Alysis updates its Compatibility INIT

By Robert Hess

San Francisco — Alysis Software Corp. has updated its Compatibility INIT to work with Apple's newest 68040-based Macintoshes and System 7.1.

The Compatibility INIT recognizes applications that are compatible with the 68040 cache as the software is launched and automatically disables the built-in cache when an incompatible application is run. Unlike Apple's Cache control panel, users don't need to restart to disable the cache.

The Compatibility INIT contains a built-in list of incompatible applications; users can update the list through a standard dialog box.

Version 3.2 adds support for the Centris series and the Quadra 800. It now works transparently with third-party application-launching software as well as the Finder, Alysis said.

The Compatibility INIT sells for $99.95. Upgrades are $29.95 plus shipping and handling.

Alysis Software Corp. is at 1231 31st Ave., San Francisco, Calif. 94122. Phone (415) 566-2263 or (800) 825-9747; fax (415) 566-9692. □

Transoft updates SCSI Director utilities

By Carolyn Said

Santa Barbara, Calif. — Transoft Corp. last week shipped Version 2.2 of its SCSI Director disk-formatting software, adding support for testing CD-ROMs and formatting and testing additional optical devices, as well as simplifying the use of removable media.

SCSI Director, available in both Light and Professional versions, can format, partition, password-protect and test any SCSI hard drive, SyQuest, floptical and optical drive. It now also can test CD-ROM discs.

Both the Light and Pro versions now support removable media as if they were floppy disk drives, allowing cartridge-to-cartridge copying. Both versions conform to SyQuest Technology Inc.'s proposed SCSIProbe interchangeability standard, Transoft said.

Version 2.2 can automatically detect and mount SCSI devices that are turned on after start-up, allowing users to start up with a SCSI device turned off and later turn on the device without having to restart or run a disk-mounting utility.

Additional features in the Professional version include: benchmark and diagnostic tests; multiple SCSI Bus support; mirroring; changing SCSI ID through software; Blitz Copy, which copies files several times faster than the Finder; and a high-speed block-level partition backup.

The Light version sells for $39; the Pro version is $129. Upgrades are $19 for Light users and $29 for Pro users. OEM versions are available.

Transoft Corp. is at 31 Parker Way, Santa Barbara, Calif. 93101. Phone (805) 963-7181 or (800) 949-6463; fax (805) 963-7178. □

Mac to enter Visix multiplatform Galaxy

By Raines Cohen

Reston, Va. — A Mac version of Visix Software Inc.'s multiplatform application-development environment is slated for release in the second quarter.

Galaxy, released last year for Unix systems, lets developers create programs that can be recompiled without changes to run across a number of platforms.

The Galaxy application programming interface provides a level of abstraction for the operating system, windowing environment and network functions, including interapplication communications. For instance, Display PostScript is used for all screen addressing, so developers don't need to determine the display system used on each platform.

The system is object-oriented and extendable, so developers can customize it by adding their own development tools and interfaces.

Galaxy is priced at $7,800 to $9,600 per developer seat, depending on platform. There are no runtime fees.

Windows and OS/2 versions will ship this month, the company said, and a VMS version is due next quarter, along with the Mac release.

Visix Software Inc. is at 11440 Commerce Park Drive, Reston, Va. 22091. Phone (703) 758-8230 or (800) 832-8668; fax (703) 758-0233. □

Biosoft enhances Ultrafit controls

By Ian G. Jacobs

Ferguson, Mo. — Biosoft last month updated its curve-fitting software to let users control the graph axes and the thickness of all drawn lines.

The $299 Ultrafit 2.1 uses nonlinear regression and either the Deming or Marquardt algorithm to plot graphs from equations. These equations can be user-defined or taken from Ultrafit's bank of 26 predefined equations; data can be keyed in or copied and pasted from other programs, such as Microsoft Excel.

Text now can be added anywhere on the screen, and all graphs can be printed directly from Ultrafit or exported into other documents.

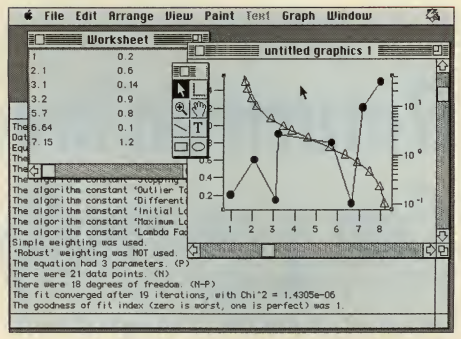
Users now can draw confidence bands and define numerical limits for all variables.

Chris Lapinsky, a beta tester at Pfizer Central Research in Groton, Conn., said he liked these new features and the program's "incredibly easy learning curve."

He added, however, that he became exasperated over the text editor and the lack of control over the number of decimal places. The price made him question the program's value, he said.

"Three hundred dollars gets you Excel," Lapinsky said. "This is no Excel." Upgrades from any previous version cost $90.

Biosoft is at P.O. Box 10938, Ferguson, Mo. 63135. Phone (314) 524-8029; fax (314) 524-8129. □



Biosoft's UltraFit 2.1 keeps a written log of all user activity. Graphs can be inset into other graphs.

DEC unveils new lineup of OEM storage devices

By Kirsten L. Parkinson

Maynard, Mass. — Digital Equipment Corp. last month announced a host of new OEM storage devices, including a tape drive that the company claims is the highest-capacity drive in the market.

- **Tape drive.** The 5.25-inch Digital Linear Tape 2000 offers a maximum capacity of 20 Gbytes with compression and a sustained data transfer rate of 2.5 Mbytes per second.

The SCSI drive will be available as an evaluation unit in the second quarter, with OEM pricing at $3,900. The drive achieves its high capacities by using a proprietary compression format and half-inch media instead of quarter-inch media, the company said.

- **3.5-inch drives.** DEC also introduced four new 1-inch-high, 3.5-inch drives.

The three models offer average seek times of less than 9.5 milliseconds. Evaluation units will be available in the second quarter in capacities of 535 Mbytes, 1 Gbyte and 1.3 Gbytes for $985, $1,185 and $1,285, respectively. The company's new half-height 3.5-inch drive, due this month for $1,985, has a capacity of 2.1 Gbytes and offers an average seek time of less than 10 milliseconds.

The drives will be available in Fast SCSI-2 and Wide SCSI-2 configurations, which offer maximum transfer rates of 10 Mbytes per second and 20 Mbytes per second, respectively.

- **RAID systems.** DEC's $20,500 OEM RAID (redundant array of inexpensive disks) system combines five 3.5-inch drives for a total capacity of 8 Gbytes. Due next month, the SHA21-ZZ system can be configured at RAID levels 0, 1, 3 or 5, which offer features such as disk striping, mirroring and fault tolerance.

A desktop system will combine either three 3.5-inch drives or two 3.5-inch drives and one half-height, 5.25-inch drive. Prices on the system, due in the second quarter, will vary based on configuration.

- **Solid-state disk drives.** DEC's newest 5.25-inch external RAM drive offers access times as low as 0.25 milliseconds. The 107-Mbyte and 267-Mbyte Fast SCSI-2 drives, which will ship this month for $13,500 and up, have a maximum data transfer rate of 10 Mbytes per second. □

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MacTools	✓		✓	✓	✓

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Management

Return on investment: Can you really measure it?

Quantifying how Mac equipment saves the company money is a tough job.

By Robert Hollis

If you're the manager given the task of determining the return on investment of your Macintosh equipment, you've got your work cut out for you.

While nearly everyone grasps that computer technology pays for itself many times over in higher efficiency and greater productivity, pinning down exactly how much more productive an organization becomes is like trying to grasp a tower of Jello. Measuring return on investment has been a challenge that has vexed managers, economists and business executives since the earliest days of personal computing.

Human variables. Several years ago, Mike Bailey, systems integrator for Lockheed Missiles and Space Co. Inc. in Sunnyvale, Calif., set out to scientifically determine the actual return the company received for its not-insignificant investment in Macintoshes.

"I reached the conclusion that it was impossible to quantify the return," he said. "There are simply too many human variables."

One example is what Bailey calls the "management-efficiency" variable. As Lockheed employees became more productive using Mac technology, managers would start assigning them more tasks.

He found it was impossible to quantify the actual savings the company was realizing for specific tasks because they were in constant flux. "Nobody puts a meter on a computer," Bailey said.

Another variable was political. When Bailey set out to determine if computerization led to a smaller work force, he met resistance from co-workers who feared losing their jobs if they cooperated with his study, he said.

This, Bailey realized, "gives people an excuse to fear the implementation of computers" — an undesirable mind-set for a technology company such as Lockheed.

Some obvious savings. Nevertheless, Bailey didn't have to be a rocket scientist to realize that as the number of Macs grew, there was a substantial drop in the number of secretaries on the payroll. Clearly, the technology gave users more power to compose, send and receive all forms of correspondence. "It used to be that every supervisor had a secretary," he said. "Now it's a lucky manager who has one."

Gordon Campbell, manager of emerging technologies at Connaught Laboratories in Swiftwater, Pa., said one of the major benefits he's observed is a computer's ability to compact time. At some companies electronic mail, for example, has replaced the U.S. Postal Service as the preferred method of sending and receiving data over long distances.

"E-mail tightens up the communications cycle," he said, making organizations more efficient. "Lots of businesses are focusing on bringing products to market faster to remain competitive, and electronic technology has been a significant benefit in this area."

Benefits for small businesses. Small-business owners have fewer difficulties than large ones in measuring the return on their computer investments. Caryl Felicetta, president of Argyle Studio, a two-person graphic design shop in Metuchen, N.J., said it's easy to measure the return on her $50,000 investment in Argyle's three-Mac system. "I saw a return on that within three months," she said.

Before she bought her first Mac about four years ago, Felicetta said she did about $50,000 worth of business a year as a free-lance graphic artist. "Now our business has gotten into the quarter-million dollar range."

The fivefold increase in volume comes from a greater range of work that she and her employee can perform using Macs, including typesetting, color comps, medical and pharmaceutical brochures, and corporate identity projects.

"We're doing work we would have turned down before we got the Macs. We also give our clients quicker service, and it costs them less for better work," Felicetta said.

Unclear on the concept. Some sectors of the economy not only have difficulty measuring computer-generated productivity, but they have come to some odd, indeed illogical, conclusions. One such example is in federal government statistics.

When a driver for Schneider National Inc., a Green Bay, Wis.-based trucking company, pulls out of the company's terminal, his delivery route is plotted for him by a computer in the home office. The company's 8,000 vehicles also carry a portable computer linked by radio to a satellite. If a customer wishes to change a delivery, the driver receives an electronic route change within minutes.

Since its installation several years ago, the system has improved the efficiency of Schneider National's service. It has cut costs and reduced the ton-miles that the fleet hauls each month, according to Dan Sellers, vice president for information systems.

Nonetheless, the U.S. Bureau of Labor Statistics considers the company less productive today because ton-miles (mileage times tonnage) is the official gauge the BLS uses to measure Schneider National productive output.

The case is hardly unique. Hundreds of trucking companies across the country use similar systems to track and direct their fleets, believing that if they didn't, they would lose business to their more-efficient competitors. Yet because of the government's inability to measure productivity gains resulting from computerization, government statistics make it appear that computerization has reduced productivity.

How to measure quality? Jeffrey Moore, assistant dean for Computer and Information Systems at Stanford University's Graduate School of Business, said that while there has been quite a bit of work done that looks at return on investment, "it tends to ignore the quality issue." How, for example, does one measure quality improvements when reports and sales presentations are produced on high-resolution laser printers?

Another shortcoming to all return-on-investment research is that it focuses on the manufacturing sector of the U.S. economy — where one can measure tangible production — while largely ignoring the growing service sector where computers are in wide use, said Ronald Schmidt, senior economist with the San Francisco Federal Reserve Bank.

Two Massachusetts economists, Catherine Morrison of Tufts University and Ernst Berndt at MIT's Sloan School of Business, concluded from their studies that from the late 1970s to the mid-1980s, there was over-investment in computers and other high-tech equipment in the 20 industry groups that make up the manufacturing sector. Like others, they did not look at the service sector.

"We found that the marginal benefit of this equipment had dropped below the price" companies paid during this period, Morrison said. "Therefore additional investment wasn't justified."

Changes in the mid-1980s. But between 1986 and 1988, the situation changed, she said. As prices for computers and software plummeted while their power to perform work grew, the numbers reversed themselves in nine of the 20 groups.

Among the nine were industries making products requiring extensive use of the technology, such as computers, instruments and publishing.

Companies manufacturing products that required less computerization, such as fabricated metals, textiles and leather, did not see nearly as good a return on their computer investments, she said.

Morrison's and Berndt's work suggests that return on investment is cyclical, depending on such variables as the declining cost and increasing power of computer systems.

The Fed's Schmidt said productivity gains resulting from increased computer usage cannot be mea-

See Investment, Page 14

RICK FRIEDMAN/BLACK STAR

Catherine Morrison, an economist at Tufts University, and Ernst Berndt (not pictured) of MIT concluded from their research that return on investment of technology depends on variables, such as declining costs and increased power of the computer system.

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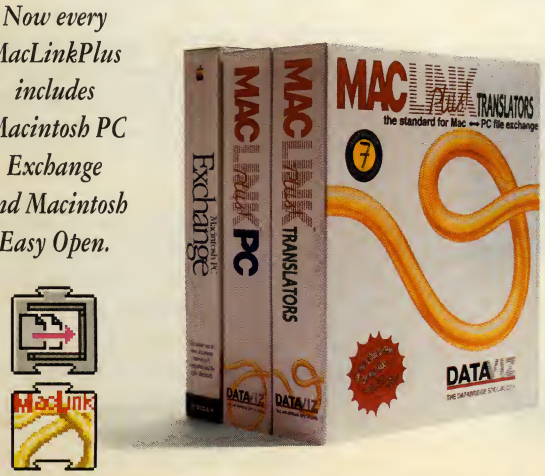

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Investment

From Page 12

sured using traditional "outputs," such as the number of widgets a factory cranks out or ton-miles a trucking business chalks up. Instead they must be measured indirectly.

Tracking salaries. Schmidt noted that salaries in some service industries, such as banking, legal and health services, have risen sharply even as government figures indicate that productivity has stagnated or declined.

From 1964 to 1986, for example, Schmidt said BLS figures show productivity per worker in banking dropped 0.2 percent while salaries rose 39.4 percent. In health care, productivity dropped 28.3 percent while salaries rose 59.4 percent. In legal services the gap is the widest: Productivity took a dive of 55.8 percent while salaries were up 91.8 percent.

Schmidt believes that contrary to the official figures, all these industries in reality experienced significant productivity gains. It is simply a case of the government being unable to detect the growth using traditional measures. He said salary growth is a far more reliable indicator of what's really happening.

"Computers have added all this capability (in these industries) but then we don't measure the output of that capability," he said. "My personal conclusion is yes, computer technology adds considerably to productivity." □

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Calendar of Events

MARCH

15-16: Lap & Palmtop, New York. Portable computing and communications conference and exposition. Contact Laptop Expositions at (212) 682-7968; fax (212) 867-8277.

15-17: Virtual Reality Systems '93, New York. The latest applications, research and business implications of virtual reality. Contact SIG-Advanced Applications Inc. at (212) 717-1318; fax (212) 861-0588.

16-19: Image World, Washington, D.C. Covers video, animation, graphics and multimedia. Contact Knowledge Industry Publications Inc. at (914) 328-9157 or (800) 248-5474; fax (914) 328-9093.

24-31: CeBit '93, Hannover, Germany. European multiplatform computer show. Contact Hannover Fairs USA at (609) 987-1202; fax (609) 987-0092.

25-27: MacShow, Houston. Regional show with Apple as participating sponsor. Contact The Show Management Company Inc. at (215) 957-9111 or (800) 622-7469; fax (215) 957-9798.

30-April 1: Intermedia '93, San Jose, Calif. Formerly the International Conference & Exposition on Multimedia and CD-ROM. Contact Reed Exhibition Companies at (203) 964-0000; fax (203) 964-0176.

APRIL

1-2: Wireless/PCS V, Washington, D.C. Wireless, voice and data technologies conference. Contact Telecommunications Reports at (202) 842-3022 or (800) 822-6338; fax (202) 842-3023.

2-4: National Apple User Group Symposium and Workshop '93, Ypsilanti, Mich. User group management and issues conference. Contact NAUGSAW '93 at (313) 482-0501; fax (313) 426-8481.

5-7: Apple Enterprise Computing Conference, San Francisco. Products and technologies to integrate client/server, mobile and workgroup computing into your network. Contact Apple at (415) 966-8978 or (800) 841-2322; fax (415) 966-8934.

12-15: FOSE '93, Washington, D.C. Federal Office Systems Exhibition. Contact National Trade Productions Inc. at (703) 683-8500 or (800) 638-8510; fax (703) 836-4486.

13-16: Seybold Boston '93, Boston. Seminar focusing on publishing technologies. Contact Seybold at (310) 457-8500 or (800) 433-5200; fax (310) 457-8510.

Please submit notices of conferences, trade shows and other Mac-related events to Calendar, MacWEEK, 301 Howard St., 15th Floor, San Francisco, Calif. 94105, or fax (415) 243-3650. No training or educational seminars please.

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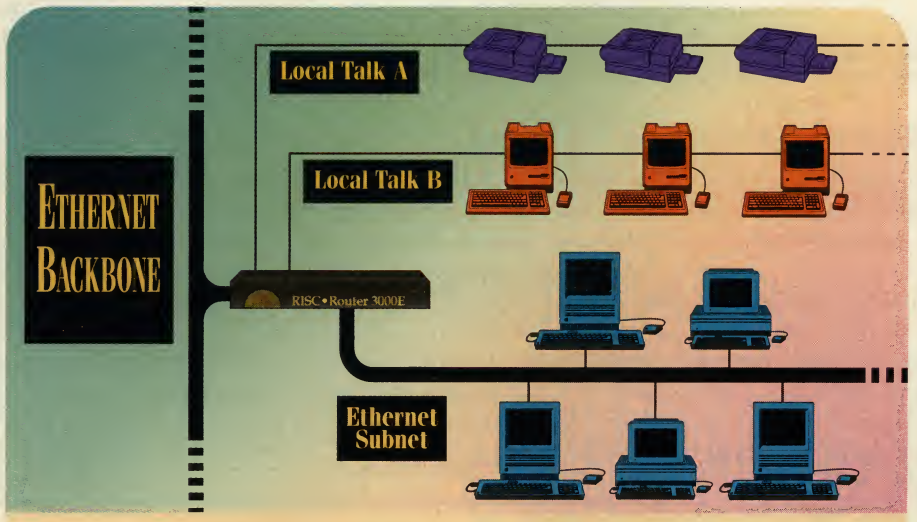
RISC·Router 3000E Ethernet-to-Ethernet Router, with 2 LocalTalks, $2995.

Q: *Why does my network need Ethernet-to-Ethernet routing?*

A: Performance and reliability. By using a RISC·Router 3000E to link an Ethernet subnet to a central backbone network, you can reduce network traffic on both sides of the router.

Q: *How does RISC·Router 3000E give my network a future?*

A: It gives you an upgrade path. RISC·Router 3000E includes two LocalTalk ports, and can be installed for about the same cost as an Ethernet-to-LocalTalk router like the GatorBox or FastPath. As your Macintoshes on LocalTalk require additional network speed, you can simply upgrade them to Ethernet and connect them to RISC·Router 3000E's Ethernet subnet.



RISC·Router 3000E creates an Ethernet subnet . This makes both the subnet and the backbone faster. It also creates a "firewall" which isolates each of the networks from problems on the other.

Route between two Ethernets and two LocalTalks for about the same cost as a GatorBox or a FastPath.

Q: *Does the RISC·Router 3000E support the standard set of features I've been using on my Ethernet-to-LocalTalk routers?*

A: Absolutely. And more! It supports AppleTalk Phase I and Phase II, TCP/IP and DECnet, MacTCP, atalkad, AppleTalk in IP tunneling, RIP, SNMP, and our own Advanced Network Security Protocol (ANSP™).

Q: *What advantages does the RISC·Router have over other Ethernet-to-Ethernet routers?*

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Sentry keeps watch on servers

Apps aim to replace AppleShare Admin

By Leonard Heymann

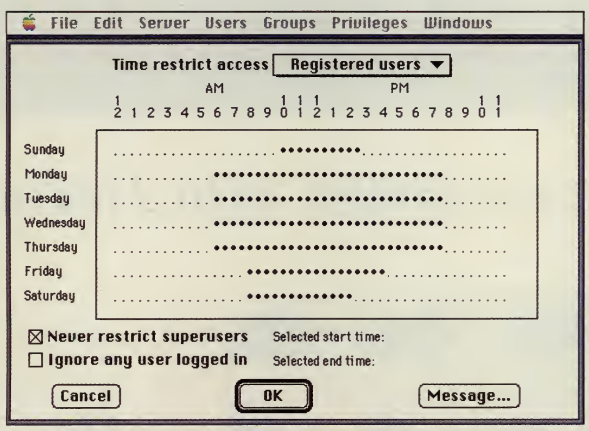
Sunnyvale, Calif. — Sonic Systems Inc. last week unveiled software for AppleShare 3 that lets administrators manage servers from their desktops.

Server Sentry, due by the end of the month for $499, is a set of applications that run on a network manager's Mac and on servers to expand AppleShare's basic administration capabilities.

The applications, Sentry Admin and Sentry Agent, communicate via Apple events, which means a scripting language, such as UserLand Software Inc.'s Frontier or the forthcoming AppleScript, could be used to automate administrative functions.

Sonic is positioning Server Sentry as a direct replacement for the AppleShare Admin, going so far as to adopt the Admin user interface.

▸ **User controls.** Administrators can restrict server access during certain times of the day or days of the week. Users can be disconnected automatically based on the time logged on the server, idle time, or whether they are registered users or guests. In addition, guests who log onto the server will have their Mac name recorded.



Sonic Systems' Server Sentry lets administrators restrict access to an AppleShare 3 server to specific times of the day or week, even for registered users.

▸ **Management.** A log file is kept that tracks server events, such as shutdown and restart, and user movements, such as log-on and log-out, time connected, and idle time. Server Sentry graphs server activity, including the number of connected users.

Alarms can be set based on a variety of criteria, including server shutdown, activity level, disk-space usage and clock synchronization. Administrators can receive alerts on their Macs or via paging messages sent by Notify! from Ex Machina Inc. of New York.

▸ **Administration.** Network managers can view multiple servers simultaneously and copy users and groups, along with their privileges, between servers. Similarly, folders can be copied across servers while maintaining ownership and access privileges. Administrators also can launch and quit applications on the server remotely.

Password protection is available for both the Sentry Admin and Sentry Agents. Additional Sentry Agents are $149 or $399 for a five-pack.

Sonic Systems Inc. is at 333 W. El Camino, No. 280, Sunnyvale, Calif. 94087. Phone (408) 736-1900; fax (408) 736-7228. □

InterCon bolsters TCP/Connect with new mail, news features

By Nathalie Welch

Herndon, Va. — InterCon Systems Corp. last month introduced new versions of its TCP/Connect II TCP/IP connectivity application and bolstered it with new mail and news features.

▸ **TCP/Connect II 1.1.** The Mac-to-Unix software now is available in a $195 basic version that supports just VT100 emulations and an FTP (File Transfer Protocol) client, and $295 VT and TN versions that expand support to include emulations for Digital Equipment Corp. and IBM Corp. terminals. A $495 extended version adds a Unix mail and news reader.

TCP/Connect II 1.1 combines the stand-alone and networked versions of the application to let users switch the network protocol they are using while the application is running, and it supports Apple's MacTCP and InterCon's own TCP/IP stack.

The new version also lets users compose mail and news postings when disconnected from a network, and then send queued mail and receive messages when reconnected.

New electronic-mail enhancements include the ability to sort and select messages according to predetermined criteria and keyboard commands that invoke mail functions. The application's Usenet news

See InterCon, Page 18

News Analysis

AURP support bogged down in AppleTalk Network Forum

By April Streeter

Washington — This week's Interop 93 Spring conference would be the logical place for router makers to talk about support for Apple's new AURP protocol. Instead, Apple and vendors once again will meet behind closed doors to debate AURP's merits.

After three years of development, Apple last month released the AppleTalk Update-based Routing Protocol (AURP), which provides tunneling features and chatter-reducing routing table update techniques needed in large AppleTalk networks. However, a competing tunneling protocol, code-named Dr. Pepper, provided momentum for a group of vendors that now hesitate to join in waving the AURP flag.

You're a pepper. In response to the Dr. Pepper coalition, Apple pledged at its January introduction of the Apple Internet Router 3.0 to put the AURP protocol under the scrutiny of the new industry group, the AppleTalk Network Forum.

Dr. Pepper developers, who along with Apple are the founding members of the ANF, applauded Apple's move. However, there is also a general consensus that the creation of the ANF slowed the process of delivering a standard, be it AURP, Dr. Pepper or something else, to users.

Pepper pops AURP. "I think [the ANF] needs to stop whining, get it together and just choose something," said Chuck Shotton,

See AURP, Page 18

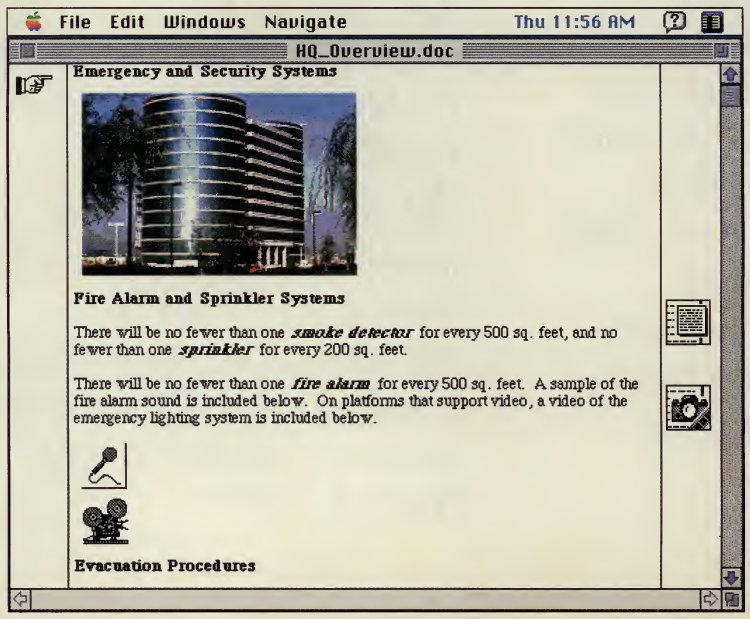
Oracle revamps tools for development environment

By Mitch Ratcliffe

Redwood Shores, Calif. — Oracle Corp. next week will revamp its CASE, programming and front-ending tools, which it will market together as an environment for building client-server applications on Oracle and third-party databases.

The company is scheduled to introduce in New York the Cooperative Development Environment (CDE), which comprises new front-ending tools, including Oracle Book and Oracle Graphics tools for building interactive multimedia applications, and renamed versions of many of Oracle's existing tools.

"The Mac becomes a real player with this release," said Farzad Dibachi, Oracle senior director of product marketing for CDE. "The Mac is not just a deployment platform, it's a development platform."



Oracle's Cooperative Development Environment will include front-ending tools called Oracle Book and Oracle Graphics for building interactive multimedia applications.

▸ **End-user tools.** Oracle Book is a graphical forms application that includes text, graphics and video fields. Oracle Book front ends can run unrecompiled on Mac, Windows and Unix clients and configure themselves to the capabilities of local systems. For instance, when running on a Mac with QuickTime, Oracle Book can display video data that is not available to a Windows client running the same application.

▸ **Programmer tools.** Oracle Graphics, Oracle Forms and Oracle Reports let users build front ends that can reconfigure themselves based on the value of a query response.

▸ **CASE tools.** Computer-aided software and engineering applications, which include a shared, distributed repository of Oracle7, IBM Corp.'s DB2 and American National Standards Institute-standard SQL procedures, can link flowcharts created by programmers and users. Charts can be converted into working forms applications for querying flat-file and relational databases.

Pricing for the new development tools has not been determined.

Oracle Corp. is at 500 Oracle Parkway, Redwood Shores, Calif. 94065. Phone (415) 506-7000; fax (415) 506-7200. □

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Pathway connects Macs, TCP/IP without gateways

By Nathalie Welch

Palo Alto, Calif. — The Wollongong Group Inc. last week shipped software to connect Mac users to TCP/IP-based electronic mail without gateways.

The company's PathWay Messaging package includes the $195 PathWay Messenger client, which provides direct access to E-mail systems based on SMTP (Simple Mail Transfer Protocol).

The optional $9,495 PathWay Messaging Services engine extends the LAN clients' reach by exchanging E-mail with X.400 messaging systems and addresses with X.500 directory services.

Clients are available for Macs, Sun SPARCstations, and IBM PCs and compatibles. The mail engine resides on an Intel-based server or SPARCstation (see MacWEEK, Nov. 9, 1992).

"Our main objective in trying out the package was to be able to pass documents back and forth on a single messaging system, especially between Macintosh and PC platforms," said Stan Douglas, director of information services at Vitalink Communications Corp., a Fremont, Calif., vendor of communications hardware. "Another was the X.500 directory access," said Douglas, who manages an E-mail network running CE Software Inc.'s QuickMail, Lotus Development Corp.'s cc:Mail, Digital Equipment Corp.'s VMSmail and Unix SendMail.

Although Douglas was impressed with PathWay Messaging, Vitalink is standardizing on Microsoft Mail.

PathWay Messaging features systemwide distribution lists, automatic message forwarding and password protection.

Wollongong said that by the end of 1993 it will extend the PathWay Messaging feature set by publishing application programming interfaces that will allow users to write mail-enabled applications for it.

The Wollongong Group Inc. is at 1129 San Antonio Road, Palo Alto, Calif. 94303-4374. Phone (415) 962-

New NuBus card from MultiAccess

By April Streeter

Santa Barbara, Calif. — At Interop 93 Spring in Washington, D.C., this week, MultiAccess Computing Corp. will introduce a NuBus card to connect Macs to switched 56-Kbps digital phone or 64-Kbps leased lines.

The MCC-256 card, due in April for $795, includes a short cable to attach the card to a channel service unit provided by the phone company, which connects users to two- or four-wire high-speed lines.

The card will support the Macintosh Communications Toolbox, AppleTalk and AppleTalk Update-based Routing Protocol. A Mac with the MCC-256 and Apple's $499 Apple Internet Router 3.0 can function as a point-to-point link capable of calling multiple sites or continually connect two LANs into a WAN.

Software included with the board controls dialing and monitors performance and line status.

MultiAccess Computing Corp. is at 5350 Hollister Ave., Suite C, Santa Barbara, Calif. 93111. Phone (805) 964-2323; fax (805) 681-7469. □

AURP

From Page 16

assistant director of academic computing at the University of Texas in Houston's Health Science Center. Shotton, an AURP beta tester, said he thinks neither Apple's protocol nor Dr. Pepper will succeed as a "general-purpose wide-area AppleTalk," but rather one will become a standardized tunneling method.

Cooperation breeds slowdown. Garry Hornbuckle, Apple AppleTalk evangelist and ANF treasurer, conceded the ANF has created a logjam over AURP support. "People have the idea that the ANF is going to straighten everything out and are taking a wait-and-see approach before they commit resources to implementing AURP," he said. "That's the approach we [at Apple] are taking to implementing the Dr. Pepper specification, so I imagine it's the attitude people on both sides of the fence are also taking."

The ANF has elected a chairman, Jay Batson, director of product marketing at Cambridge, Mass.-based Cayman Systems Inc. Jonathan Wenocur, software engineer at Westboro, Mass.-based Shiva Corp., has been tapped to be the group's president. They will meet with Hornbuckle here this week. The first meeting open to users is scheduled for the Mactivity '93 conference during June in San Jose, Calif. □

InterCon

From Page 16

reader now lets users select different font and Usenet filtering preferences.

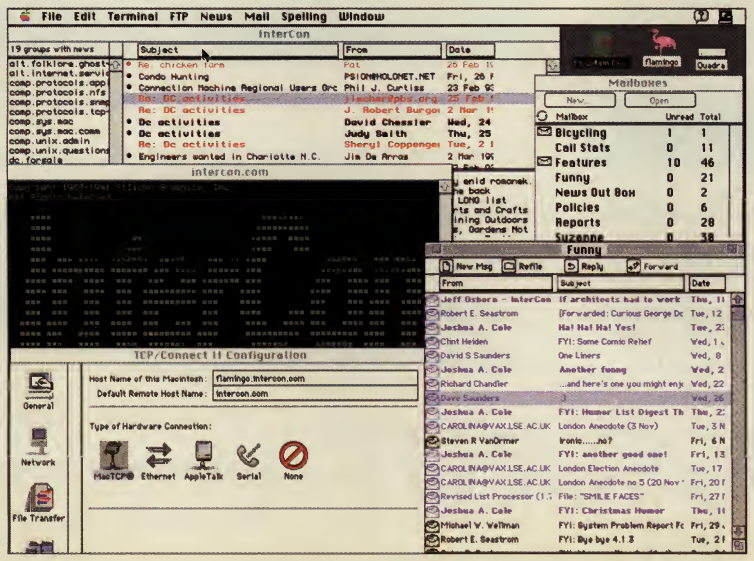
New support for publish and subscribe lets users share address books or distribute address updates automatically.

Upgrades are free under InterCon's extended support program or if the software was purchased after Oct. 15, 1992. Older versions can be upgraded for between $19.95 and $49.95, depending on configuration.

▶ **Dispatcher/MacX.400 for QuickMail.** In related news, InterCon said it is scheduled to ship next week a gateway that links users of CE Software Inc.'s QuickMail package to Apple's MacX.400 servers. Dispatcher/MacX.400 provides full X.400 functionality, including address mapping between X.400 and the QuickMail interface.

The $1,995 Dispatcher/MacX.400 for QuickMail SD is compatible with Apple's $2,950 MacX.400 SD (Single Domain) X.400 server. InterCon's $2,995 Dispatcher/MacX.400 for QuickMail MD supports Apple's $4,950 MacX.400 server for enterprise connectivity.

InterCon Systems Corp. is at 950 Herndon Parkway, Herndon, Va. 22070. Phone (703) 709-5500; fax (703) 709-5555. □



InterCon Systems' reworked TCP/Connect II 1.1 can list all of the users' mailboxes, as well as how many messages they contain and how many are unread.

Gateways BRIEFS

Rockwell adds MNP Level 10 to chip sets

Newport Beach, Calif. — Rockwell International Corp. last month began offering MNP Level 10 as a standard feature in all its high-speed V.32 and V.32bis data, fax and voice chip sets. Rockwell chips form the technology base for many third-party modems.

MNP 10, called an adverse-channel protocol, enhances modem communications over cellular links and poor-quality land lines. Rockwell previously offered the protocol as a standard feature in its V.22bis devices and as an option in its V.32 and V.32bis products.

In addition, Microcom Inc. of Norwood, Mass., the developer of MNP Level 10, and Rockwell have agreed to develop protocol extensions for new modem technologies, such as adaptive line probing, which are anticipated to result from the creation of the V.Fast standard in late 1993.

Rockwell International Corp.'s Digital Communications Division is at 4311 Jamboree Road, P.O. Box C, Newport Beach, Calif. 92658-8902. Phone (714) 833-4600; fax (714) 833-4078.

Lancast transceiver connects Ethernet, 10BASE T

Amherst, N.H. — This week at Interop 93 Spring in Washington, D.C., Lancast will unveil a transceiver that connects thick-net Ethernet devices to shielded or unshielded 10BASE T networks.

The ENT-4320-1, due in the second quarter for $79.95, has an AUI (attachment unit interface) on one end and an RJ-45 port on the other. The transceiver's RJ-45 port allows users to connect thick- or thin-net Ethernet devices to either unshielded or shielded twisted-pair networks. The ENT-4320-1 has five LED indicators to let the user see the status of the Ethernet line.

Lancast, a division of Casat Technology Co., is at 10 Northern Blvd., Unit 5, Amherst, N.H. 03031. Phone (603) 880-1883 or (800) 752-2768; fax (603) 881-9888.

USD Motorola cuts $200 off price of modems

Huntsville, Ala. — USD Motorola this month shaved $200 off the price of its V.32 and V.32bis rackmount and stand-alone modems.

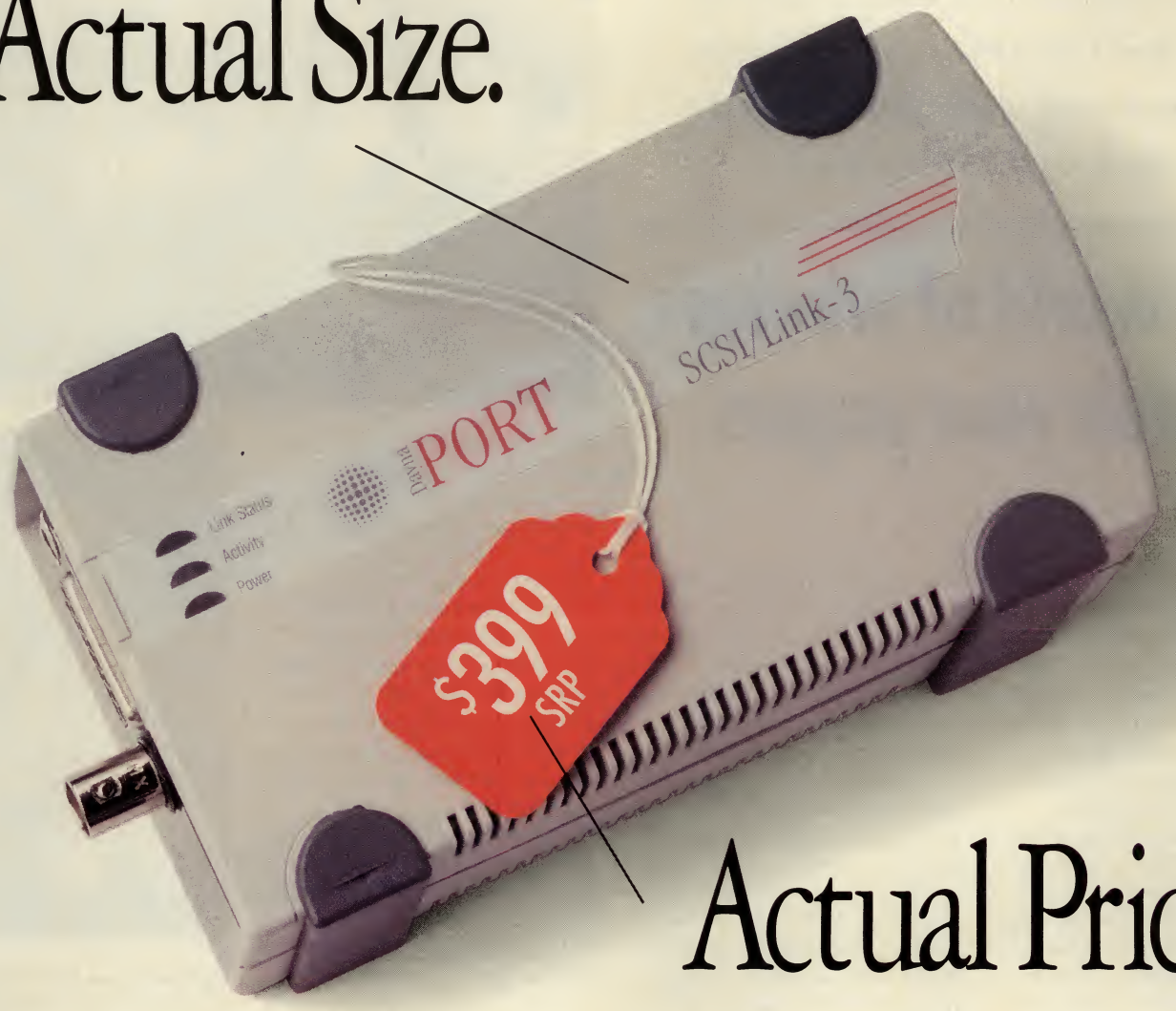
The V.3229L, a 14.4-Kbps modem that supports V.32bis, V.42, V.42bis and MNP levels 2 through 5, is now $795. A rackmount version costs $770. The V.3227L, a 9,600-bps modem supporting V.32, V.42, V.42bis and MNP 2 through 5, is now $695. The rackmount model is $670. The V.3225L, a 9,600-bps modem supporting V.32 and MNP 2 through 5, is now $650, while the rackmount version costs $630. Finally the V.32L, a 9,600-bps modem supporting V.32 and V.22bis, is $595. The rackmount model is $570.

USD Motorola is at 5000 Bradford Drive, Huntsville, Ala. 35805. Phone (205) 430-8000; fax (205) 430-8208.

"The smallest, lightest SCSI Ethernet interface available for the Mac."

– MacUser, February 1993

Actual Size.



Actual Price!*

The editors of *MacUser* magazine said it best. DaynaPORT SCSI/Link is the smallest, lightest SCSI Ethernet adapter on the market today.

Macintosh SCSI Ethernet Adapter Comparison	DaynaPORT SCSI/Link	Asanté EN/SC	Focus EtherLAN SC
Dimensions	6"x3"x1.75"	8"x4"x1.5"	7.5"x5.5"x1.5"
Weight	13 oz.	24 oz.	25 oz.
Pass through SCSI	Yes	Yes	No
SCSI termination switch	Yes	No	No
3-in-1 models available	Yes	Yes	No
Autosensing Ethernet ports	Yes	No	No
Onboard SCSI controller	Yes	No	Yes
100% Apple SCSI compatible†	Yes	No	No
SCSI cable included	Yes	Yes	No
Warranty	Lifetime	5 years	5 years

†Only SCSI/Link fully implements the IEEE SCSI specifications without modifying the Apple SCSI Manager.

But don't just try us for our size. Compare us feature for feature with our competition and you'll see that we've packed a whole lot of value into a very small product. SCSI/Link includes two SCSI ports and a handy termination switch, so it's easy to connect anywhere in your SCSI chain. And unlike our competitors, we designed our product to be fully compatible with Apple's SCSI Manager, for maximum reliability and compatibility with all Mac models.

Add to that our reputation for quality engineering design and manufacturing, our superb technical support and our no-nonsense lifetime warranty, and you simply won't find a better, safer buy from anyone else in the Mac networking industry.

MacWEEK Macintosh Volume Buyers (MVBs) take note. You can try SCSI/Link FREE OF CHARGE for 30 days. Call us today at 1-800-44DAYNA and ask about our *MacWEEK* MVB evaluation program.

Dayna®

Macintosh Networking Specialists

yes It runs with NetWare

*Retail prices for SCSI/Link range from $399 to $499 depending on model. Actual prices (street prices) for all our products are typically about 25% to 30% less than retail. Check with your favorite reseller for current prices.

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Special Report

Wireless communications

How many wireless data technologies can you name? Probably not all of them. In this Special Report, MacWEEK looks at the range of technologies available now or on the Mac horizon, as well as the research into the possible health hazards of wireless devices.

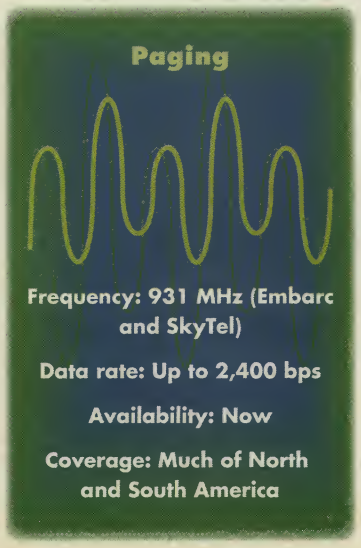
In the wide world of wireless, don't overlook your pagers

By Larry Stevens

Users don't have to stay by their Macs to garner the benefits of networked connectivity, nor must they have Newtons or PowerBooks. Paging software allows users to send messages from their Macs to common alphanumeric pagers.

Electronic-mail, personal information managers and network-management software helps users organize their personal and professional lives. But they also all share one major drawback: They can't help you unless you're near your Mac. Pagers — currently the most widespread and inexpensive wireless technology — can eliminate that obstacle.

The pagers of history. Ray Kirtland, senior systems analyst for Mac network projects at Sprint Corp. of Kansas City, Mo., is experimenting with all three of the available Mac paging packages. He believes the main advantage of paging software is that it allows a message to get through no matter where the recipient is. "With standard numeric paging, you almost always have to call back to get your message," he said. "The problem is that if your pager beeps, it probably means you're moving around, which is the worst thing to be doing when trying to win at phone tag. With paging software, a good percentage of the time all the needed information appears on the pager. So the communication is complete in one operation."



Paging software for the Mac was first introduced last year. In January 1992, Caravelle Networks Corp. of Nepean, Ontario, introduced NetWorks, which can transmit notification of network problems to alphanumeric pagers. At about the same time, Ex Machina Inc. of New York introduced Notify!, paging software that has received a good deal of support from paging hardware vendors as well as makers of a wide variety of software. Last June, Caravelle released its stand-alone paging product, PagerPRO. Wolf Creek Group Inc. of Jensen Beach, Fla., also released its QM-Page, an extension to CE Software Inc.'s QuickMail, in June.

Connecting to desktop apps. To use paging software, you have to subscribe to a wireless messaging service, such as those offered by SkyTel Corp., Motorola Inc. and Mobile Comm Communications Corp. Messages generated by the software are sent from the paging software through a modem to the messaging service. From there they are transmitted to an alphanumeric pager, such as the Advisor from Motorola.

Both PagerPRO and Notify! allow users to send messages from a Mac to a pager in what is sometimes called "stand-alone" mode. You simply type the message in a PagerPRO or Notify! screen, and the program, which contains built-in communications scripts, can send the message to virtually any alphanumeric pager.

Additionally, both programs allow you to program applications that support Apple events to transmit data directly. In this mode, users can transmit a message from, for example, a database without having to first import the text into the paging software. However, unless the application includes built-in support for the paging software, users will have to write their own Apple-event interface.

Notify! enjoys the largest base of supporting software products. This support is heaviest in three major categories: E-mail, including Microsoft Mail and QuickMail; personal information managers, including products from Essential Software Inc. and PMC Telesystems Inc.; and network monitors from companies such as Neon Software Inc. and Santorini Consulting & Design Inc.

Currently, no Mac application has built-in support for PagerPRO. However, according to Caravelle, 15 applications will support PagerPRO within the next six months. A QuickMail gateway is expected by spring.

Finding recipients in the trenches. Dan Horn, advanced technology coordinator for CNN Headline News of Atlanta, uses Notify! to let his company's QuickMail users send messages to recipients in the field.

"We bought Notify! because, while we could always page our correspondents, they don't always have a phone available to return our call," Horn said.

Horn pointed out that workers at the Atlanta headquarters often merely want to instruct a photographer to shoot a particular scene or specify to a reporter which satellite channel to access. In the past, a beeping pager would send the recipient scurrying to track down a phone — not always easy in remote areas of the world where Headline News employees find themselves. Now a QuickMail user at Headline News types a brief (fewer than 200 characters) QuickMail message and sends it through Notify! to the recipient's pager, in many cases eliminating the need for a call-back.

While CNN uses Notify! for communications between headquarters and field workers, David Gessel, a scientist in Apple's Advanced Technology Group, uses it to send messages to himself. Gessel depends on Easy Alarms from Essential Software of Staatsburg, N.Y., to get him to appointments on time. But when he has an early morning appointment or has to remember to do something in the evening, he uses Notify! to send messages from his desktop organizer software to his pager. "The paging software extends the use of the computer so it can help me even when I'm not attending to it," Gessel said.

ROB NELSON/BLACK STAR

ROB CRANDALL

Dan Horn (top), CNN Headline News advanced technology coordinator, used Notify! during Bill Clinton's inauguration to send QuickMail messages from his Atlanta office to Sardi Bernard's pager while Bernard covered the event from an unfinished building overlooking the Capitol (bottom).

Network monitoring. Alan Germain, network manager at a large aerospace company, said that before installing NetWorks "often, the first time I heard that there was a problem on the network was when an angry user called me."

Germain had used other network-monitoring software, but he often travels around the plant, and as he put it, "A monitoring system isn't very helpful if you're on the second floor working on a problem and [the software is] signaling an alarm on your Mac on the first floor."

Now when an alarm occurs, NetWorks sends a description of the problem to Germain's pager. "Now that I learn about problems as soon as they occur, I'm in a better position to handle them in an organized way instead of having

See Pagers, Page 22

PCS: Wireless' great hope?

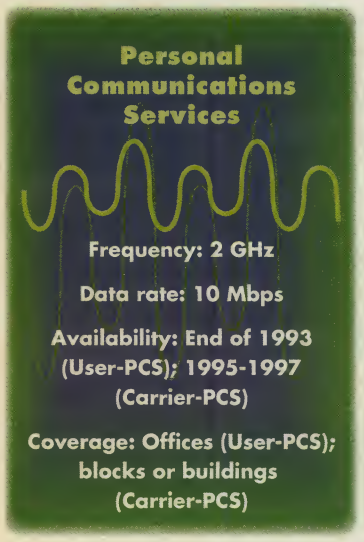
By Margie Wylie

What to expect when and if the FCC authorizes new bandwidth for PCS.

The proposed standards for personal communications services promise to provide a nationwide, dedicated space to run wireless LANs, modems and handheld devices at high speeds, letting users roam untethered from offices and keep in constant touch with Newtons, PowerBooks and a new breed of wireless phones.

While the personal communications services (PCS) ideal is revolutionary, the reality will be more complex than enthusiasts have let on. Like any other technology, PCS will crawl before walking and is likely to stumble along the way.

The story until now. If you are looking for a wireless LAN or mobile computer, be prepared to pay dearly and even then, depending on your choice, suffer poor performance.



Because most of the radio spectrum in the United States already is spoken for, wireless LANs and other services have squeezed into the cracks between bands that are dedicated to other purposes or forced users to turn to expensive private radio networks, such as Ardis or Embarc.

In 1991, Apple petitioned the Federal Communications Commission for 40 MHz of the radio spectrum in the 2-GHz range to be cleared for the express use of PCS. Apple and other backers envisioned the spectrum as a sort of haven where digital communications could operate free from interference and high fees.

This year the FCC is expected to grant PCS only 20 MHz of spectrum (between 1,910 and 1,930 MHz) for local users only. That service has become known as User-PCS. Long-haul services in the PCS band are to be provided (and charged for) by carriers, which must win FCC licenses for the privilege. These PCS services have become known as Carrier-PCS.

User-PCS and Carrier-PCS will offer different advantages, applications and limitations. And each will arrive on its own timetable.

User-PCS: Citizens band data. Apple's principal scientist for communications technology, Jim Lovette, likes to describe User-PCS as "Data-CB," referring to citizens band radio.

Expected first, User-PCS will let low-power (up to 1-watt) devices communicate within about 50 meters of one another at speeds up to 10 Mbps. User-PCS won't require users to purchase a license or pay fees above the purchase price of the devices.

First, however, the FCC and would-be User-PCS device manufacturers face the challenges of clearing out entrenched users and figuring out how to share that 20 MHz. Those two issues are being tackled by an industry group called WINForum (see story, next page).

WINForum members, however, worry that 20 MHz — half of what Apple asked for — won't offer enough room in which to implement the sharing scheme, which could cause initial devices to be unable to interoperate.

Apple's Lovette broods about how the FCC will define a PCS device narrowly enough to keep out interlopers without killing innovative uses of the band. He said that with more spectrum, the FCC would never have to worry about classifying "legitimate users" as long as they observed the proper transmission etiquette.

If the frequencies can be cleared of their current users in time and the ground rules can be laid, some companies, such as Apple and Hewlett-Packard Co., expect to produce User-PCS devices by the end of the year.

However, the only thing these early devices are likely to have in common is spectrum, said Brice Clark, strategic planning manager for Hewlett-Packard's Roseville, Calif., facility. Without standard network protocols, an Apple Newton and an HP 95LX won't be able to communicate.

"The idea of a single standard and a single technology that's going to make everybody happy just isn't a reality, now or in the immediate future," Clark said.

"It's going to take years, really, and even through the course of years there are probably going to be two or three different de facto standards."

As one of the Apple-appointed stewards for AppleTalk protocols on non-Mac platforms, Farallon Computing Inc. of Alameda, Calif., is trying to convince vendors that AppleTalk ought to be one of those de facto standards for wireless devices. But it's unclear how many converts the company will garner.

In the end, the standard likely will arise out of the Institute of Electrical and Electronic Engineers' 802.11 committee, which is working on wireless protocol standards for existing LANs. But progress might be slow since the committee is focusing on technology that is fundamentally different from User-PCS.

If the hoped-for devices make it this year, they still aren't likely to have any access to wide-area or mobile services anytime soon. Carrier-PCS services that link local Data-PCS transceivers may trail the rollout of in-building User-PCS systems by anywhere from two to five years, Clark said.

Meanwhile, users who want access to their home networks when they aren't within 50 meters of an access point may find themselves turning to cellular or other established commercial radio networks.

According to Clark, User-PCS services are so far separated on the electromagnetic spectrum from those services that it's not currently possible to create a channel-agile device that can switch between them. To use both a cellular or a commercial radio service as well as User-PCS, the device would need two receivers and transmitters. That might mean carrying two devices, or it might mean carrying two plug-in "modems," one for Data-PCS and one for another mobile service.

If you're waiting for the day when your Newton can switch between voice and data and use whatever bandwidth is available, from PCS to low earth-orbiting satellites, don't hold your breath. "I personally think that's not in the cards this decade," HP's Clark said.

For voice users, PCS' initial constraints will limit applications to wireless PBXes or wireless phones. But until Carrier-PCS services are available, your PCS phone will be useless outside your building.

Despite its limitations, User-PCS is expected to be a hotbed for innovation because of one fundamental difference from any other wireless networking scheme available: The bandwidth is free. Some User-PCS advocates see its counterpart, Carrier-PCS, as

See PCS, next page

Glossary for the PCS-perplexed

Personal communications services (PCS) is a generic term for the wireless communications systems being built for public use. Since its introduction in 1991, however, the term has taken on several hyphenated versions that refer to particular facets:

- **Carrier-PCS** (also Licensed-PCS) refers to paid services provided by a telecommunications company. The carrier must obtain a license from the Federal Communications Commission to operate in a specific, geographical area, much the way cellular phone companies operate.
- **User-PCS** (also Unlicensed-PCS) is the free bandwidth available to buyers of low-power devices and transceivers. Because User-PCS requires transmissions at limited power levels, these networks will operate in about a 50-meter radius only.
- **Data-PCS** refers to services or devices transmitting data, rather than voice, whether via a carrier or over the free, local PCS band.
- **Voice-PCS** refers to services or devices that handle voice, whether via a carrier or over the free PCS band. — By Margie Wylie

PCS

From previous page

merely an extension to existing mobile services.

Improving on cellular. "Carrier PCS is interesting because there are alternatives," Clark said.

As with cellular networks, Carrier-PCS providers will own the licenses to operate Carrier-PCS services within specific geographic areas, and they will charge users for their services. Carrier-PCS services will be able to operate better from enclosed spaces, such as buildings or tunnels, because microwaves penetrate those structures.

Carrier-PCS also will offer denser coverage than traditional cellular, with micro-cells the size of city blocks or even buildings. Traditional cells range anywhere from 1 to 20 miles.

"If you shrink down the radius of a cell, that means the frequency you are using in that cell can be reused in another cell that may be not right beside the first one, but maybe one cell removed," Clark said. "So you can repeat the use of these frequencies again, and that gives you more and more utilization of the same spectrum." Smaller cells, however, could have problems maintaining connections for fast-moving users, such as those in cars.

The FCC has not decided how many markets to establish or how to hand out licenses. The commission is considering offering anywhere from one to 487 licenses, which could be distributed by lottery or auction, by selecting an applicant who plans to make the best use of the spectrum or any combination of the above.

The wireless People's Park is expected to draw the applications that will shape future wireless networks and services.

It could take some time to decide because the agency hopes to try to avoid the mistakes it made with the cellular industry and to encourage more-aggressive pricing. Lovette, however, thinks Carrier-PCS prices may be as stiff as cellular or commercial wireless data services, such as Motorola Inc.'s Embarc.

Right now sending data over the existing cellular network is "more of a glamorous idea than a reality," Lovette said. He said that only 50,000 to 60,000 cellular modems have been sold in the United States, far less than a month's production of laptop computers.

But by the time Carrier-PCS is deployed, anywhere from two to four years, Clark said, cellular will have gained ground. Like Carrier-PCS, cellular companies are going digital, for faster, more-reliable data transmission, and they also are reducing the size of their cells.

Carrier-PCS also may face competition from an unexpected front: User-PCS. Clark expects that places where users congregate, such as hotels and airports, will begin offering User-PCS services as a courtesy.

"I might walk into a Marriott Hotel, for instance, and see a sign that says 'Equipped for User-PCS,' " Clark said. "With my little wireless device, I might be able to hop into this wireless network and navigate my way back to my own desktop."

Beyond the prickles. Still, those hurdles aren't expected to greatly slow PCS' growth. Wireless products sales, which totaled $79 million in 1991, are expected to grow to about $235 million by 1995, according to Insight Research Corp. of Livingston, N.J.

Many vendors expect much of that growth to come from User-PCS. Even with its drawbacks, the wireless People's Park is expected to draw the applications that will shape future wireless networks and services.

Users brave enough to buy right away will do so because they need the connections and aren't afraid of the technology, Clark said. The consumer market, however, isn't likely to be enticed until the wrinkles are ironed out.

"There will be lots of things in between [now and the standardization of PCS] and lots of experiments," Clark said. "Some will be financially successful and some not." □

Industry group proposes User-PCS etiquette

Jim Lovette is no Emily Post. Apple's principal scientist for communications technology, however, is a passionate advocate for civilly sharing the wireless spectrum.

That's why he's a member of the Wireless Information Networks Forum, a group of more than 40 companies that is writing the book on how everything from cordless phones to Newtons will share their little slice of air.

"Users of unlicensed spectrum have to take a new attitude — more like ecological conservationists than strip miners," said Lovette in a remark delivered last October at the IEEE International Symposium on Personal, Indoor and Mobile Radio Communications. Vendors have to guard and manage scarce personal communications services (PCS) bandwidth the same as any other natural resource, he said.

But WINForum isn't counting on the good will of device makers. The group wants the Federal Communications Commission to codify its play-nice rules in Part 15 of the FCC regulations. Part 15 governs how devices behave in an unlicensed, public-use band, such as the industrial, science and medical (ISM) bands (which most wireless LANs today share with garage-door openers, industrial meat cookers and nearly any other device that emits radio frequencies) or the notoriously cacophonous citizens band.

WINForum faces a formidable challenge in formulating rules that allow everyone their fair shares of air time without squeezing out innovation, said Brice Clark, strategic planning manager at Hewlett-Packard Co.'s Roseville, Calif., facility. Every rule has consequences for product design.

"There are many technologies being explored by companies to solve different types of problems," Clark said. "The idea behind WINForum is to come up with an etiquette that would let all those types of solutions that have different constraints be able to use this new spectrum that the FCC is talking about allocating for User-PCS."

Here are a few rules being considered:

- **Listen before speaking.** To prevent devices from interfering with others, each will have to listen for a clear band before transmitting. If the preferred band isn't clear, the device will have to switch channels and power levels until it finds a clear band.

Such channel-agile and power-agile devices will cost more money because they require more-sophisticated technology.

- **Yield the floor.** WINForum is considering dividing Data-PCS' meager 20 MHz of spectrum so that different services have priority in different bands. For example, narrow-band services that require less speed, such as voice or low-speed data, may populate one end of the spectrum, with wide-band, high-speed data senders, such as a 10-Mbps LAN, at the other.

Devices unable to find spectrum in their primary channels could use the other channels if they were free, but they would have to yield to a primary user if it needs the channel.

- **Don't speak louder than necessary.** To conserve bandwidth and prevent the power ratcheting that came to characterize other unlicensed services, such as CB, devices wouldn't be allowed to transmit at any power higher than necessary. Devices would be required to drop down to lower power levels dynamically when possible.

Again, power-agile devices cost more money, and the forum is considering exceptions to this rule when a particular device never transmits above a certain power level.

- **Don't shout down others.** The etiquette may forbid devices from using "predatory protocols" or high-powered devices to trample over other transmissions.

WINForum, deemed an overwhelming success by participants, is beginning to turn its attention to other issues, such as how to relocate the current occupants of the proposed PCS bands. To finance the moves, it is considering several plans, including assessing Data-PCS users a one-time user fee the first time they use a device. — By Margie Wylie

Pagers

From Page 20

to do crisis management all the time," Germain said.

Seamless connection to QuickMail. The main advantages of QM-Page for Joe Lalley, manager for the maintenance and service operations at Cornell University in Ithaca, N.Y., is that it is an extension to QuickMail and so doesn't require users to go through an extra application to send messages. "Anyone who uses QuickMail, no matter what kind of hardware they have or how comfortable they are with computers, can send a page," Lalley said. "The advantage is that the message is sent using a familiar QuickMail form."

Lalley's department, which is responsible for routine maintenance and light construction at the university, got alphanumeric pagers last April. At first they were used only by the maintenance department to keep up with jobs, but the idea spread, and now the university is in the midst of a project to connect all QuickMail users to the paging system.

"My vision is that E-mail will be sent to individuals, not to computers. That's the plan we're working on," Lalley said.

Bill Kalmbach, engineering specialist at Motorola's Microprocessor and Memory Technologies Group in Austin, Texas, echoes Lalley's sentiments. "A large proportion of our employees carry alphanumeric pagers," Kalmbach said. "Now [using QM-Page] reaching them is as easy as reaching someone who stays put. We just type the pager number in QuickMail, and the communication is complete."

Hardware considerations. Alternatives to standard pagers are emerging. Last year Hewlett-Packard Co. of Palo Alto, Calif., announced that Notify! can send messages to its HP 95LX palmtop computer, which includes Lotus Corp.'s Lotus 1-2-3, Appointment Book and five other programs in ROM. Reminders from programs such as Easy Alarms or stock quotes from the CompuServe Information Service can be sent via Notify! from a deskbound computer to a paging network. The data is captured by Motorola's NewsStream receiver, which can be connected to HP's palmtop. Finally, HP's Mobile Data Link software inserts the data in the appropriate program. For example, appointments and reminders from Easy Alarms can update the palmtop's Appointment Book file, and stock quotes from CompuServe can update a Lotus spreadsheet.

According to Ex Machina, Motorola's NewsStream receiver soon will be outfitted with an adapter that allows it to send data to PowerBooks in a similar fashion. Once the data is captured in the PowerBook, Ex Machina's new product, Update!, will update the appropriate application just as HP's Mobile Data Link software updates the 95LX. □

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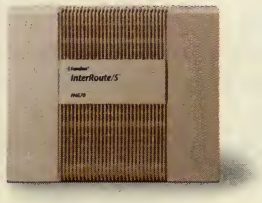

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Wireless LANs are due for an encore

By Jeff Ubois

Infrared LANs are gearing for a comeback, and spread-spectrum radio is waiting in the wings.

The plan was to eliminate the expensive, unreliable, immovable wire in LANs and replace it with wireless technologies that were fast, cheap and flexible. Like a lot of great ideas, it didn't work out.

Infrared light has been used in various computer applications for more than a decade, and it was the basis for some of the first attempts at wireless networking. But most of the companies that positioned their products as whiz-bang replacements for wired networks now emphasize integration rather than competition. And now new higher-frequency radio technologies are being directed to LAN applications.

Getting physical. Unfortunately, in the midst of the rebirth of the wireless LAN, choices open to Macintosh users are limited.

"I am kind of surprised there are not more products targeted at the Mac because it's always been my perception that Mac users are a bit more open to certain types of innovative products," said Ira Brodsky, president of Datacomm Research Co., a market research and consulting company in Wilmette, Ill.

In IBM PC and compatible environments, adapters that plug directly into the parallel port, or wireless network adapters built onto cards, are available already. But Mac users are restricted to physical-layer solutions that connect to wired Ethernet or token-ring LANs, such as Altair from Motorola Inc. of Arlington Heights, Ill.; InfraLAN from InfraLAN Technologies Inc. of Acton, Mass. (formerly BICC Communications Inc.); and FreePort from WinData Inc. of Northboro, Mass.

Money up in smoke? Buying a wireless adapter in addition to a network-interface card seems uneconomical at first, but it does make integration with existing wire-based networks more straightforward. Replacing only the physical layer of the network allows the operating system and third-party software to act exactly as they would when using a wire-based connection. Physical-layer wireless also allows network administrators to manage nodes as if they were connected by cable and eliminates the need for special drivers or other software.

As a result, wireless LANs are being applied gradually in places where pulling wire doesn't make sense: where construction is difficult or when setups are temporary. Wireless LAN technology also works for applications that require quick setup times, such as during disaster-recovery operations.

"[Even] if you are going to move one time within a three-year period, it's usually economical to use wireless, but costs are affected by other things — for example, when you have asbestos or in historic buildings with marble walls and floors," said William McCarthy, chief operating officer of InfraLAN.

Geographic location also plays a big role in determining whether wireless makes economic sense. "The cost of labor to pull the wire ranges dramatically from city to city — from $500 to $1,000 in large cities to $150 to $200 in remote areas," McCarthy said.

Other transmission technologies. Radio-based technologies are offering useful characteristics that infrared systems can't emulate. Infrared offers faster speeds, fewer interference problems, and freedom from licensing requirements and health concerns. But it has a big drawback: Infrared can't travel between floors or through walls.

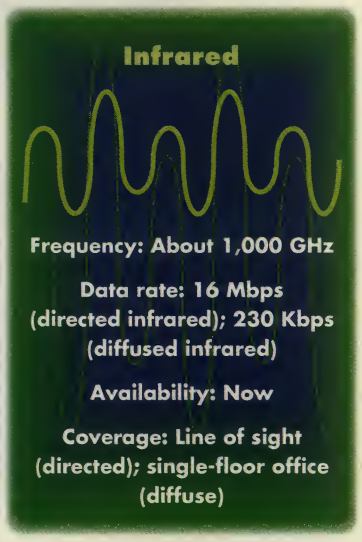
"The primary advantage of radio-based systems is they don't have a line-of-sight requirement," McCarthy said. "The advantage of point-to-point infrared is it has relatively no bandwidth limitations, while radio-based systems' speed will be limited by the bandwidth allocated to them.

"Because infrared doesn't require a license or health and safety approvals, we can move from country to country or state to state relatively easily," he said.

Infrared comes in two basic flavors: point to point, also called directed, and diffuse. Directed infrared includes low-speed technologies, such as those used in remote controls for televisions, where the two devices have to be aligned closely to work. Directed infrared also is found in higher-speed reflective systems, which allow signals to bounce once off a ceiling or a wall.

InfraLAN Technologies, for example, uses directed infrared for the performance. The company recently introduced some 16-Mbps token-ring products and said it is working on 100-Mbps products.

Diffuse infrared reduces the requirement for line-of-sight transmission by working with multiple reflected signals. Photonics Corp. of San Jose, Calif., whose ill-fated PhotoLink had used directed infrared to provide LocalTalk connections, is now switching over to diffuse technology to get around line-of-sight requirements. The company plans to bring out a new Mac product, called Cooperative, this fall at about $250 per adapter.



Tuning in to radio. The major alternative to infrared is radio-based wireless LANs, which fall into two basic categories: conventional narrow-band and spread-spectrum.

Narrow-band systems operate on a single designated frequency. For example, Motorola's narrow-band Altair runs at a frequency of 18 GHz. Such systems can be simpler to design and build and offer the possibility of high data rates with low power outputs. Unfortunately, they typically require getting a license from the Federal Communications Commission to operate, although with the Altair, Motorola handles all customer licensing requirements.

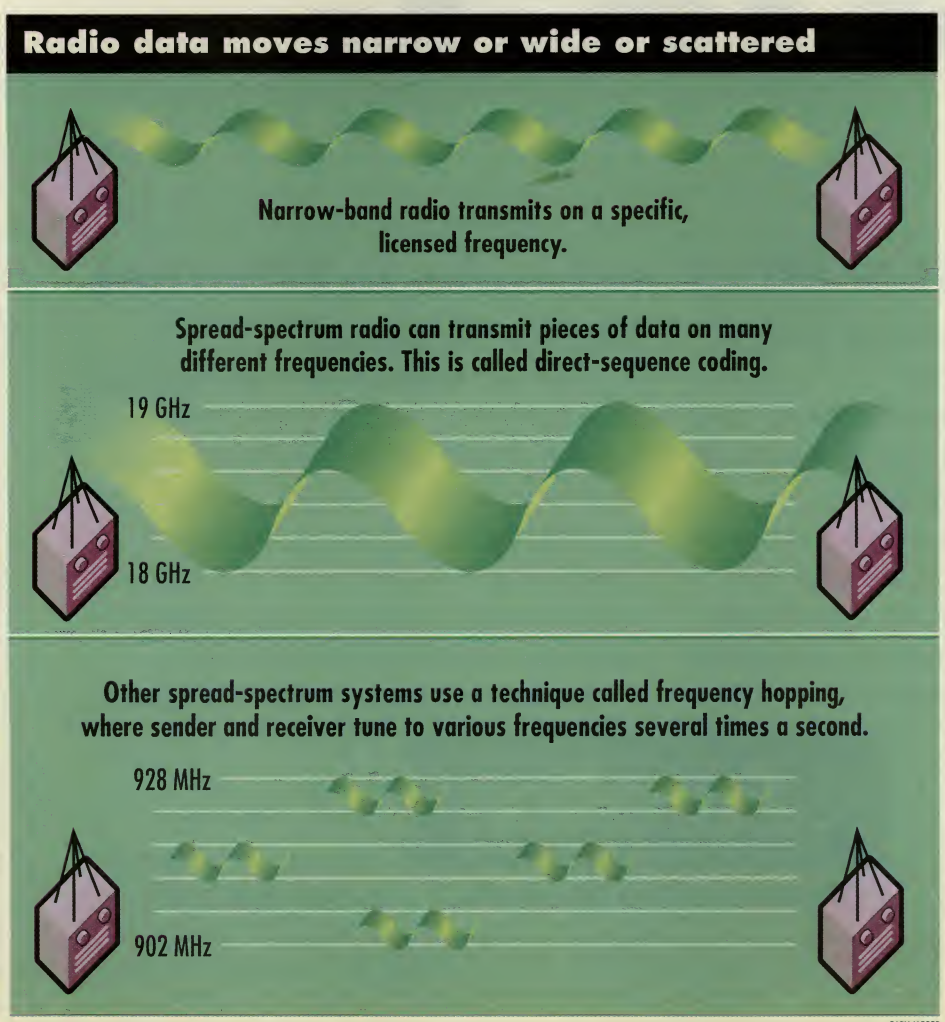
> Geographic location plays a big role in determining whether wireless LANs make economic sense.

Spread-spectrum systems don't require FCC licenses within certain frequencies if their power output is less than 1 watt. Their proponents also said they are more resistant to interference problems. (In fact, spread-spectrum technology was developed during World War II to prevent interference from German ships that attempted to jam the steering signals of Allied torpedoes.)

"Spread-spectrum is not terribly efficient from a bandwidth standpoint," said Bob Rosenbaum, director of marketing at WinData, "but you get that back where you can have many systems operating in the same area. And being license-free is a significant advantage."

Divisions in a spread. Two spread-spectrum technologies have

See Spectrum, Page 26



GARY JAEGER

Digital data to fill the cracks in cellular phone network

By Joe Dallatore

Two schemes use free air time to transmit data.

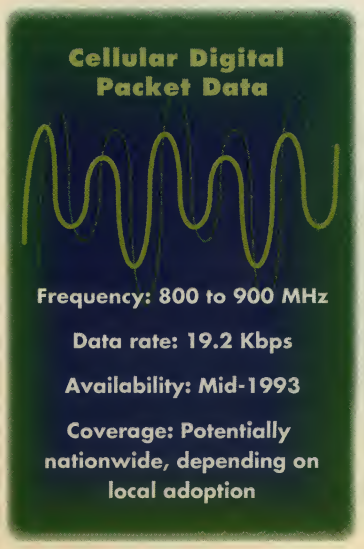
The wireless technology most corporate users are familiar with probably is the cellular telephone. The cellular system already reaches just about everywhere in the United States, and the entire country is expected to have cellular service by the end of 1994. A system that would ride on the existing cellular phone infrastructure would offer the easiest way to provide nationwide coverage for digital data services.

Demand outstrips supply. The Federal Communications Commission has allocated a limited range of the electromagnetic spectrum for cellular phone service. And what they say about land also is true of the radio spectrum: They're not making any more of it.

Currently, 50 MHz has been allocated between 800 and 900 MHz caps. The analog cellular phone standard, Advanced Mobile Phone Service, divides this allocation into 832 channels of 30 KHz each. Locations equipped for cellular transmission, called cell sites or simply cells, can be configured to support a varying number of channels.

A typical urban cell provides 57 channels and could cover an area as small as 1 square mile or even a single building (usually called a microcell). Rural cells typically are configured to provide more channels in a single cell site and to cover a wider area.

Unlike wired telephone services, the cellular carriers can't add more channels as demand increases. And the cellular system already is overburdened in some areas — just ask any cellular phone owner in New York, Los Angeles or the San Francisco Bay area how long it can take to get a free channel during a normal business day.



Products exist today that connect portable computers with modems to cellular telephones; the analog cellular network already is carrying digital data. But if, as many analysts and pundits predict, there is a coming explosion of digital traffic, the increased demand on cellular bandwidth will far outstrip supply in busy areas.

Noncellular networks. In major cities, alternative radio-based data networks, such as Ardis Co.'s Ardis and RAM Mobile Data Inc.'s Mobitex, use privately allocated frequencies to transmit data to mobile computers. But these systems are expensive and cannot be expanded to provide nationwide coverage without major capital investments and long FCC approval processes. One proposed solution is to run Ardis over cellular phone circuits in addition to private radio frequencies.

At current rates, it would cost about $500 to send 1 Mbyte of data over Ardis at 9,600 bps. A similar data transfer over an analog cellular link would be charged based on the air time required to send the data — perhaps one-tenth the cost of Ardis, but it still would be prohibitively expensive for most users.

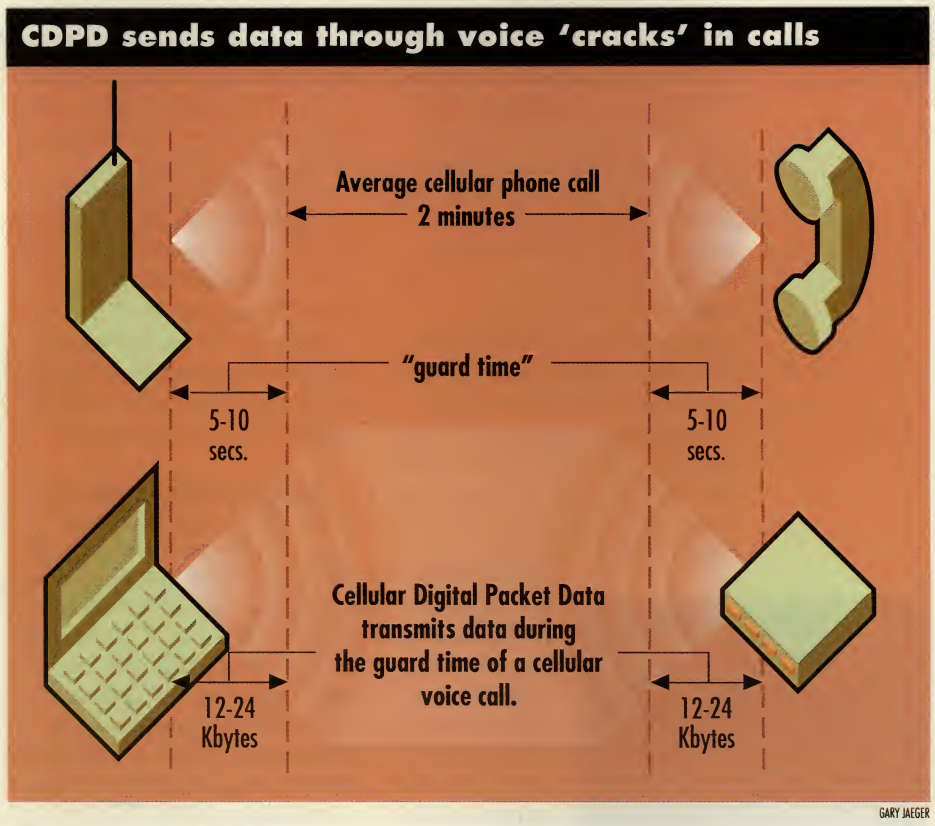
Another proposed solution is the use of local data networks, such as specialized mobile radio networks (SMRs). Existing SMRs, however, give priority to voice service, and SMR coverage is even spottier than Ardis and RAM Mobitex.

Two designs for carrying digital data over existing cellular telephone frequencies have attracted the most attention. Each system enables digital data transmission using the cellular frequency range and infrastructure without adding additional load to existing voice channels.

This sounds like trying to get something for nothing, but it isn't. As with closet space, you just have to be very clever in maximizing what you already have.

CDPD. Cellular Digital Packet Data (CDPD), also called CelluPlan II, was designed by IBM Corp. and a group of nine cellular service providers, including McCaw Cellular Communications Inc. and Bell Atlantic Mobile Systems Inc. CDPD sends data over any one of the 832 cellular channels that is idle at the moment a data transmission begins.

When a cellular voice call ends, the newly released channel remains unavailable for a new voice call for five to 10 seconds, according to Joe Grlica, director of business development at Bell Atlantic Mobile Systems of Bedminster, N.J. During this "guard time," CDPD uses the idle voice channel to transmit digital data packets. Grlica said the average cellular call time is just two minutes, so a typical urban cell with 57 channels has five to 10 seconds available on every channel every two minutes. Since it takes about one-tenth of a second to transmit a 256-byte packet at 19.2 Kbps, the cell can handle an enormous volume of data without adding any new demands on the existing voice channels.



GARY JAEGER

> Will WPDP vs. CDPD become a networking version of the PostScript vs. TrueType wars?

WPDP. Wireless Packet Data Protocol (WPDP), designed by Cellular Data Inc. of Palo Alto, Calif., utilizes the gaps between existing cellular voice channel frequencies to transmit data packets. Bell Atlantic Mobile Systems is installing CDI's equipment in 25 to 30 cell sites in the Baltimore area and will offer WPDP service by the end of this month.

Initially, Bell Atlantic plans to support one data pathway adjacent to each voice channel. Depending on the configuration of a cell site, however, it is possible to provide more that one such interstitial channel between two voice channels, said Lee Horspan marketing manager of CDI.

WPDP supports transmission rates of only 2,400 bps and packet sizes of 128 bytes or less, but the system requires less power. A WPDP transmitter needs only 200 milliwatts, compared with 0.6 to 3.0 watts typical for portable CDPD transmitters. However, CDPD's radio-frequency power can be reduced to as low as 100 milliwatts when the node is close to a cell site.

CDI's technology is designed to service the wireless messaging market, which the company characterizes as needing a mechanism with a small physical size and low power to exchange infrequent, small messages among a large number of subscribers. For example, one Westinghouse Electric Corp. division will use the CDI cellular service with Westinghouse-developed hardware and software in a transportation-industry application to "monitor and manage the movements of fleets of vehicles and track the pickup and delivery of time-sensitive cargo and payloads in the Baltimore metropolitan region," according to CDI.

Another standards battle? Recently, Apple announced that support for CDPD will be added to a future version of AppleTalk Remote Access (see MacWEEK, Nov. 23, 1992). Will WPDP vs. CDPD be a networking version of the PostScript vs. TrueType wars?

"The physics of the two systems are complementary," said CDI's Horspan. And so are the economics and the performance levels of the systems.

Bell Atlantic's role may indicate that carriers will cover both bases. It's one of the cellular companies that helped design CDPD, but it also owns 5 percent of CDI and already is buying and installing

See Cellular, next page

Cellular

From previous page

CDI's equipment in test markets. Is Bell Atlantic hedging its bets?

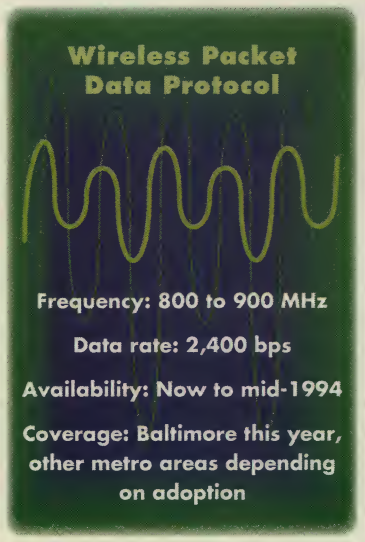
"CDPD is more robust, faster, supports switched-circuit connections and can combine voice and data over the same channel," Bell Atlantic's Grlica said. But "CDI's technology is ready today." Echoing the claim that the two systems are complementary, he predicted that Bell Atlantic will install CDPD hardware as products become available.

According to Horspan, WPDP is not suitable for high volume or real-time data, but it will cost much less to operate because the lower power requirements means components will be smaller and cheaper. WPDP operates only in a packet-burst mode, which works fine for telemetry data, such as the current location of vehicles, or for sending status, inventory or alarm reports from smart vending machines and security systems. Packet bursts also are appropriate for transmitting electronic-mail messages and even low-volume data broadcasts, but they do not work well for applications that need high bandwidth or continuous, consistent connections.

CDPD does provide the higher bandwidth and switched-circuit links that interactive wireless networking environments, such as AppleTalk Remote Access, require. CDPD also can provide voice and connection-oriented data transmission simultaneously, which will make building hybrid voice-data devices easier.

The price of the goods. No matter which protocol is used, these data circuits will charge by the packet rather than by air time, so wireless data circuits will cost significantly less than data carried over current cellular voice channels. This opens the possibility that a portable system could be connected all the time, with the owner paying only for data transmitted and received.

These cellular data technologies could, therefore, offer one of the key features of today's paging systems: constant communication with the home office. No more checking for new information or new mail — it would be transmitted to you while you do more of whatever it is you do to justify the price of the device in the first place. □



Spectrum

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evolved so far: frequency hopping and direct-sequence coding, also called code-division multiplexing.

Frequency hopping is narrow-band radio with St. Vitus' dance; a matched transmitter and receiver pair change channels many times per second. Interference isn't much of a problem because no one channel is particularly critical.

Direct-sequence coding is used by WinData's FreePort and in upcoming devices from Digital Ocean of Overland Park, Kan. With direct-sequence coding, a "chipping" code of 10 bits or more is used to represent each bit of data — a seemingly inefficient method. But each matched pair of transceivers uses a different chipping code, so multiple pairs can operate within receiving distance of each other. And, the codes for ones and zeros are inverses of each other, so even if only eight bits of a 10-bit chipping code get through, the receiver should be able to determine correctly what bit was transmitted.

Despite the inherent redundancy of direct-sequence coding, such systems offer higher data rates. "One problem with frequency hopping is you are limited to about 1 Mbps," WinData's Rosenbaum said. "We're getting about 12 Mbps."

Apple and the IEEE. Standards for wireless networks haven't evolved far, so single-vendor solutions with no cross-system compatibility are the norm. Part of the problem is simple: The FCC hasn't finished making decisions about spectrum allocations.

Two proposals, one from Apple and one from the Institute of Electrical & Electronic Engineers, are worth watching. Apple's Data-PCS proposal requested that the FCC set aside a portion of the spectrum for unlicensed radio-based networking (see story, Page 21).

"Apple's vision is a very good one and is likely to come true," Datacomm's Brodsky said. But in the meantime, Apple reportedly is working on a MiniDock-like device for its PowerBook Duos that will be based on frequency-hopping radio.

Jonathon Cheah, editor of the proposed IEEE 802.11 standard for wireless networks due out later this year, said his organization's specifications will cover the physical and Media Access Control layers of the Open Systems Interconnection model and will be able to communicate with Ethernet and token-ring networks' Data Link layers.

When completed, Cheah said the standard should result in reduced costs because chip manufacturers will have a stable specification to build to. But in the meantime, Cheah, who is an engineer for a large aerospace company, said, "Right now there are no sensible products out there we can use — and that means there is still a huge unfulfilled market." □

Guest editorial by Craig O. McCaw

A PDA — or a GameBoy?

The term personal digital assistant, or PDA, conceptualized by Apple's John Sculley, had its first birthday just two months ago. As a concept it was an immediate hit because it combined two powerful ideas, personal computing and personal communications, and put them in a single palm-size mobile device.

The original PDA idea was potent because it was a consumer device targeted at a mainstream market rather than the next form factor for personal computers.

Failure to communicate. This is a vision that my company has long shared — a world in which a person's voice and data communications follow them effortlessly. But recently we have become concerned because the industry seems to be losing sight of that vision.

We have heard talk that many of the PDA-class devices planned by many companies are being scaled back significantly. The communications component of this powerful concept is being de-emphasized or completely eliminated, resulting in devices that seem to be only high-end personal information managers.

This loss of vision translates into missing the large potential market for communicating PDAs. A joke currently circulating among our technology group poses the question: What do you call a PDA without wireless communications? Answer: a GameBoy.

Potential customers for PDAs know what they are willing to pay for an electronic organizer or a portable video game. They have heard the call of the PDA and are excited by it. They will not buy overpriced electronic organizers positioned as PDAs.

What can we do to avoid missing the target with PDAs? Let them communicate.

Small wonder. Our industry has been hard at work developing the Cellular Digital Packet Data (CDPD) specification, a protocol that promises to empower low-cost, power-miserly, highly miniaturized PDAs with voice and data capabilities. This basic capability ensures that PDAs can take advantage of robust, anytime, anywhere communications.

We know that the personal computer industry understands how to integrate more processing power into a smaller package. Now, the personal-communications industry has added the capability to utilize this power to turn a small computing device into the hub of a personal network. Alone, these capabilities are no more attractive than their manifestations — a subnotebook computer and a cellular phone.

Although these are both high-growth markets, our belief is that the synergy created by their combination represents such a powerful value to customers that apart, these markets will look small in retrospect.

Interface lift. Perhaps the most critical component to unleash this market is the user interface. If we believe that the PDA is the hub of a personal network, then its interface ought to be as comfortable and easy to use as the most commonly used communications devices.

The telephone, television and radio all represent broadly used, mass communications systems with simple yet powerful user interfaces. This power lies in their capabilities to hide complexity from the user and produce a predictable outcome on any device. Wireless communicating PDAs with similarly powered and simple user interfaces will find strong consumer acceptance.

Look before you hype. The development of real PDAs will take more time than glorified GameBoys will. Let's allow the "boy" to grow up before we rush him off to work.

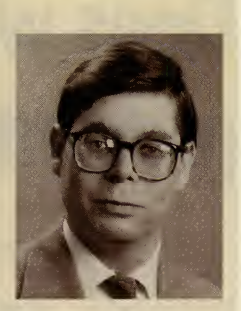
On a number of occasions the computer industry, in its haste to announce and deliver new products, has disappointed the public by promising blue sky and then leaving it stuck in the mud.

It would be unfortunate to allow the pressure to announce new products to shortcut the development of an intelligent, human, friendly device with enough capability to fulfill customer needs. □

Craig O. McCaw is chairman and CEO of McCaw Cellular Communications Inc. of Kirkland, Wash.

Guest editorial by Alan A. Reiter

'Sometime, somewhere' vision



High in the towers of corporate America, chairmen, presidents and CEOs are conjuring up "visions" to spur their companies to greater heights. One of those visions — apparently a group vision — is "anytime, anywhere computing."

It is a useful and exciting vision: to combine the power of mobile communications with new generations of portable computers. With anytime, anywhere computing businesspeople and consumers will be able to transmit and receive messages and access databases through a variety of wireless and wired networks.

But oxygen-thin air in executive suites is causing some visionaries and their disciples to evangelize anytime, anywhere computing as if it were here today. Unfortunately, we've now got "sometime, somewhere computing," and it will remain that way until after 1995.

It's not that this is such a sorry state. In the United States alone, more than 20 million people are using cellular phones and pagers. Few users have connected these devices to portable computers and are experiencing the power of wireless data communications. Also, some 40,000 subscribers are using packet-radio networks from Ardis Co., a subsidiary of Motorola Inc., and RAM Mobile Data Inc. Conduct business with any of these users, and you quickly will see the power of these tools.

However, there is a danger that potential customers for wireless communications will believe that the vision is the reality — and then be disillusioned when the products fall short.

Perhaps the most reliable mobile network is paging, which provides excellent in-building penetration. Paging systems offer extensive local, regional and nationwide coverage. Pagers, which can receive everything from a beep to a text message, weigh only a few ounces and can last for weeks on a single battery. In addition, some paging networks offer seamless roaming — the capability to reach a subscriber across the country.

But paging is one-way, and there's no way to ensure the recipient gets the message. They also lack sufficient channels in some major cities and for nationwide systems. As a result, it's expensive to transmit even a short message. A few hundred characters can cost $6 or more.

However, over some paging systems, the cost of sending the same message to hundreds of users is virtually the same as sending it to one. For companies with large field forces, text paging can be especially economical when using such one-way networks as SkyTel Corp.'s SkyTel and Motorola's Embarc.

Cellular technology can be economical for some data transmissions. Voice and data rates are typically 20 to 60 cents per minute. Using a modem with error control and compression, data can be transmitted at 4,800 bps, perhaps twice as fast. For interactive on-line sessions and facsimile, cellular is tops.

One problem is that reliability varies among cellular systems. And popular 0.6-watt portable phones aren't as reliable as bulkier transportable phones or in-vehicle mobiles that operate at 3 watts. Subscribers also can be charged extra for using systems outside their local area. Also, there's no such thing as seamless roaming for voice, let alone for data.

Many of these problems are expected to be ameliorated by a new technology, developed by IBM Corp. and McCaw Cellular Communications Inc., and endorsed (more or less) by the largest cellular operators in the country. On paper, Cellular Digital Packet Data (CDPD) looks great: the reliability of packet data combined with seamless roaming.

Yet CDPD still is being tested and the final specs haven't been nailed down. Developing the network software will not be easy. CDPD isn't likely to effect the wireless data market until 1994; some experts say 1995.

Although cellular technology has the advantage of offering voice and data, the new public packet-radio networks of Ardis and RAM were built from the ground up for wireless data. RAM offers seamless roaming, no extra charge for nationwide service and a variety of systems integrators for vertical-market applications.

Ardis has better coverage than RAM but is, so far, concentrating on offering service to large- and medium-size companies. Individual subscribers aren't particularly welcome. RAM is very interested in offering services, such as electronic mail, to traveling executives. But RAM's coverage doesn't match that of Ardis or cellular.

Despite these problems, hundreds of thousands of people are using mobile-data networks in the United States. Many corporate users are receiving paybacks from wireless data in less than a year.

"Sometime, somewhere computing" is valuable right now. What's not valuable is hype. □

Alan A. Reiter is editor of Mobile Data Report and En Route Technology based in Alexandria, Va.

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Does wireless technology present a health threat?

By Mitzi Waltz

With wireless technology coming into its own, researchers are calling for study into potential health hazards.

Wireless networks sound like a dream come true to managers: no more snaking cables and the capability to link portable machines into networks via technology similar to cellular phone systems. But wireless computing may have a dark side.

As cellular-equipment manufacturers reel from highly publicized allegations that their products may cause cancer in frequent users, and with the federal government recommending caution and further studies, wireless networking is due a second look.

The alleged villain is radio frequencies (RFs) or microwaves, high-level electromagnetic fields (EMFs) that can carry signals from wireless devices to transceivers and, eventually, to their destinations.

Calculating risks. Well-publicized studies have linked certain EMFs to health problems. Some researchers in the United States and Sweden have found links between continued exposure to low-level EMFs from high-voltage power lines and leukemia or other cancers, for example, while others have linked VDT emissions to miscarriages. These findings, however, were neither conclusive nor dramatic, and others have found no links.

At the RF level, EMF research is sketchier, although some researchers are suspicious. "The orthodox view is that the only effect of microwaves should be heating, and that at this low level [in wireless devices] there should be no danger," said Jerome Beers, a radiologist at Shields Health Care Group Inc. of Brockton, Mass. "The unorthodox view, which is becoming harder to refute, is that there are other effects of microwaves that may be unrelated to the power level." Hypothetically, he said, these effects may result from repeated changes in frequency or specific frequencies that cause damage to human cells under specific conditions.

Such effects, if they exist, probably are relatively uncommon, Beers said. But unlike everyday, transient sources of EMFs, cellular phones and wireless personal digital assistants may be carried close to the body throughout the day, potentially increasing the risk of overexposure.

Call for studies. "Here we are introducing a whole new source of radiation into the office without really looking at the potential for danger," said Louis Slesin, editor of the New York-based Microwave News, a newsletter on EMF and RF issues. Slesin said that the cellular phone industry has been especially loath to fund research, even after battling lawsuits alleging effects such as brain cancer from long-term cellular phone use.

Martin Nierwienski, manager of technical support for the Washington, D.C.-based Cellular Telephone Industry Association, is in charge of testing new cellular devices to make sure they meet CTIA standards. "There have been lots of studies on low-frequency radiation, but in the frequency used by cellular and two-way radios, there hasn't been much," Nierwienski said. He said that the CTIA has initiated no studies of its own and he is unaware of any research being carried out in the United States.

"The most promising and specific study is just starting in Britain," Nierwienski said. "Cellular carriers, in concert with the British government, have instituted a three-year study to look for physical effects."

The computer industry has shown more interest in self-investigation, Microwave News' Slesin said, perhaps because companies want to ensure that developing wireless projects will not be expensive mistakes. "At this time, there are no defined risks," said Apple spokeswoman Marianne Lettieri. "But we have given testimony to Congress supporting continued research, and when we made our petition to the FCC (Federal Communications Commission) to have spectrum allocated for this emerging industry, we noted that we would like continuing investigation made in this area."

Industry interest. Along with IBM Corp. and Compaq Computer Corp., Apple is funding the Center for VDT and Health Research at the Johns Hopkins University School of Hygiene and Public Health in Baltimore. Associate Director Dr. Patrick Brysse said he's unaware of plans for research into the bandwidths used by cellular phones or wireless networks. "It would be premature to say what research we're going to undertake because we're just starting out," he said. Brysse said he's unaware of any cellular or wireless research taking place elsewhere.

Johns Hopkins' efforts will add to the body of EMF research already carried out by the Department of Defense, the Department of Energy, the U.S. Navy and the electric-power industry, Shields' Beers said, adding that he hopes the center's findings, positive or negative, will be made public.

"The Environmental Protection Agency, which in the early 1980s did seem to have some interesting research, had its funding removed," Beers said. "Some EPA staffers came up with a fairly large document with the conclusion that electromagnetic and radio-frequency fields are probable or possible carcinogens, respectively, in about 1990." Their findings were circulated for internal review but, according to Microwave News, they were suppressed.

Companies that can't fund their own research are watching carefully. "It is a serious concern of ours," said Ed Kleban, vice president for technical communications at Overland Park, Kan.-based Digital Ocean Inc., a maker of wireless LAN products.

Kleban said industry leadership is needed to minimize exposure. "The spectrum used for wireless communications is becoming very popular," he said. "It's used for cordless telephones, security systems and a new generation of radio products. The problem is that as you bring more products into the environment, you bring more noise, and the less reliable it becomes. If I have a problem with interference, one of the best things I can do is turn up the power — which adds to the problem.

"Apple has been a leader in the new personal data-networking band," Kleban said. "Is that going to be another free-for-all, or is someone going to say, 'There's an environmentally responsible way to manage use of this spectrum,' instead of letting everybody play the escalation game?"

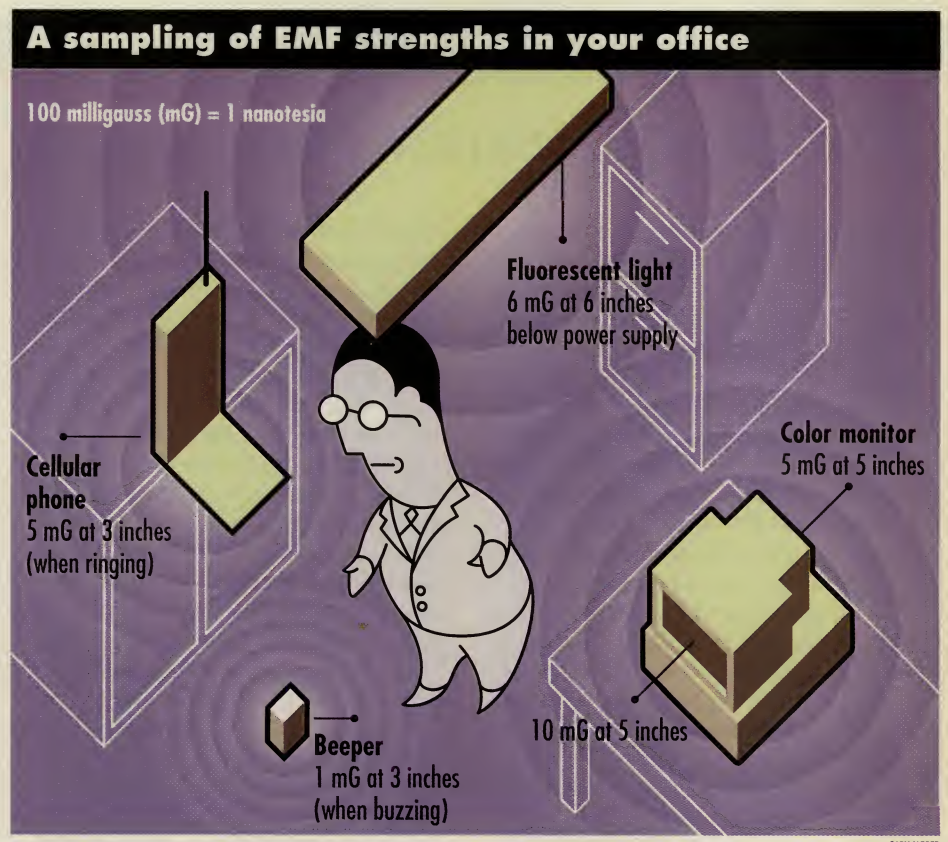
The FCC's standards for cellular phones and wireless LAN products differ. Car phones can transmit at up to 3 watts, while handheld models are limited to 0.6 watts. Wireless LAN products, however, are allowed up to 1 watt. "That 1 watt is somewhere between that 0.6 and 3 watts the FCC said I shouldn't be carrying," Kleban said.

Other concerns. While the risks to physical health may be slight — much lower than the danger of driving a car, for example — other possible problems have received less attention. For instance, some parties (including security agencies in the United States and the former Soviet Union, who are alleged to have conducted research in this area), believe certain electromagnetic frequencies can create emotional or mental states, such as irritability or depression.

It behooves the computer industry and government to encourage and fund studies on possible hazards, said Microwave News' Slesin. He pointed to a new energy bill that included funds for more research on power-line/leukemia links as a positive step.

"Certainly the Clinton administration will be more interested in occupational health issues — and you can't do any less than we did under Reagan and Bush," Slesin said. "But it's a long road from good intentions to action."

With the attention of investigative reporters around the nation, as well as some members of Congress, now trained on cellular EMFs, the chances seem good that studies applicable to microwave radiation dangers will be undertaken at last. □



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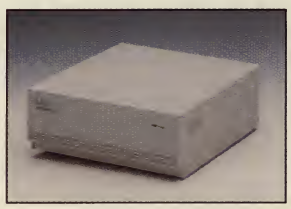

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Ricoh to unveil 30-bit, 1,200-dpi color flatbed

By Matthew Rothenberg

San Jose, Calif. — Ricoh Corp. this month will take a pass at the flatbed scanner market with the introduction of a 1,200-dpi, 30-bit-color model.

Ricoh will unveil the FS2 this month at the CeBIT '93 consumer-electronics show in Hanover, Germany. It will ship in the United States late in the second quarter, Ricoh said. The scanner will be priced to compete against other 1,200-dpi flatbed scanners, such as the $3,950 Arcus from Agfa of Wilmington, Mass., and the $4,600 UC1200S from Umax Technologies Inc. of Santa Clara, Calif.

The new Ricoh scanner can capture letter-size images at a hardware resolution of 600 by 1,200 pixels in a single pass. Its CCD (charge-coupled device) sensors scan 10 bits each of RGB (red, green, blue) data per pixel, then optimizes that information for 24-bit color. The device can capture a full-color, 300-dpi image in 20 seconds, the company said.

Users will be able to adjust image resolution from 50 to 1,200 dpi, control 1,204 levels each of brightness and contrast, and select from among four predefined or two customizable gamma curves.

The FS2 will ship with a SCSI-2 interface and scanning software, although Ricoh declined to name the software package. The scanner probably will be available with an optional 30-sheet feeder and an attachment for scanning transparencies.

The FS2 will support Twain, an application programming interface standard that links software directly to compatible input devices.

Ricoh Corp. is at 3001 Orchard Parkway, San Jose, Calif. 95134. Phone (408) 432-8800; fax (408) 432-8372. □

TelevEyes outputs Mac graphics for video devices

Digital Vision also plans scan converter

By Neil McManus

Dedham, Mass. — Digital Vision Inc. now is shipping a video encoder that lets users output Mac graphics and presentations to televisions, camcorders and VCRs.

The company also is preparing a scan converter that offers high-end video production features, such as genlock, flicker control, and over- and under-scan control.

▸ **TelevEyes.** Available now for $299.95, this external box intercepts Mac video and outputs composite or S-video signals to NTSC devices.

TelevEyes works with most Mac video cards that offer 640-by-480-pixel resolution, but it's not compatible with the video capabilities built into such Macs as the IIsi, IIci and LC, the company said.

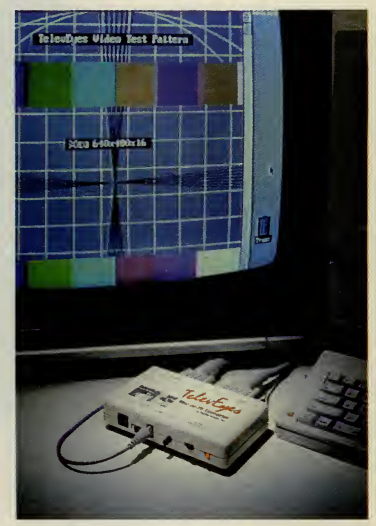
Digital Vision's device comes with a hue-control dial and a switch that lets users toggle between their Mac monitor and video output.

▸ **TelevEyes/Pro.** Due to ship in June for $699.95, this scan converter box will offer genlock capabilities, essential in synchronizing two video signals. This feature will let users overlay titles or graphics onto live video via a selectable color key.

TelevEyes/Pro also will contain a vertical-line filter system that smooths outgoing images for flicker-free output of single-pixel lines.

The Pro version also will let users output Mac graphics with a black border (under-scan) or fill an entire video screen (over-scan).

Digital Vision Inc. is at 270 Bridge St., Dedham, Mass. 02026. Phone (617) 329-5400; fax (617) 329-6286. □



TelevEyes intercepts Mac video and outputs composite or S-video signals.

New XTensions help XPress users customize layouts

By Carolyn Said

Fort Collins, Colo. — QuarkXPress users can customize the desktop publishing program to their heart's content with the latest batch of XTensions.

XChange, a clearinghouse for XTensions, is offering more than a dozen new add-ons to Quark Inc.'s QuarkXPress. They include:

▸ **SXetch Pad,** developed by Datastream Imaging Systems Inc. and due later this month for $229, will add illustration features to XPress. SXetch Pad will let users convert type to outline form and fill it with colors or blends, type on a curved path, import illustrations as Encapsulated PostScript files, use TIFF or PICT images as templates for tracing, create multicolor blends of spot or process colors, and draw Bezier curves.

▸ **Combs XT,** available for $99, was developed by Durrant Software Ltd. to let users add data "combs," or grids for completing forms and applications, to XPress documents.

▸ **TypeMaster,** $99, developed by Sparking Mad Software, lets users click and drag type to adjust kerning, scaling and baseline shift.

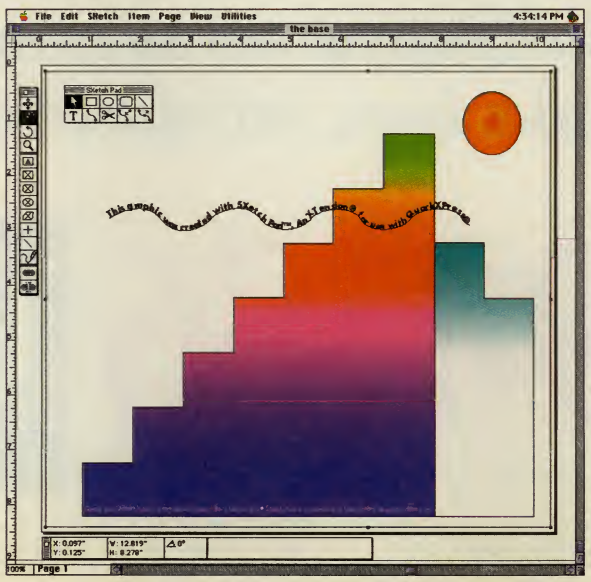
▸ **Design Tools,** a $49-to-$149 collection that was developed by Integrated Software Inc., adds autosave, star-burst-creation, picture-scaling, nudge, skew, drop-shadow and report-creation features.

▸ **PrintIt,** $79, developed by a lowly apprentice production, lets users designate pages, text or picture boxes, or selected page areas to print or save as EPS files.

▸ **Logical XTension I,** $79, developed by Alphalogic, expands XPress' crop-mark facility and provides tools to change text case. Logical XTension II, $119, provides a manual kerning palette. Logical XTension V, $119, lets users import database records into XPress with automatic formatting.

▸ **TruPack,** $99, developed by

See XTensions, Page 34



SXetch Pad, a QuarkXTension, will integrate illustration features into QuarkXPress, including multicolor blends of spot or process colors and type that follows a curved path.

Photo editors get new tools at NPPA digital conference

By Jeff Ubois

Washington — New products for image capture, management and networking are making digital photography a reality at many newspapers, and vendors expect these technologies to trickle down to a broad base of users over the next three to five years.

That was the message at the Digital '93 conference, sponsored by the National Press Photographers Association here last month.

Product introductions at the show indicate that imaging is moving from proprietary high-end systems to the desktop.

▸ **The Associated Press** unveiled AP MacArchive, a $4,995 Mac-based system that uses Aldus Fetch to store and retrieve digital image files from the AP Leaf Picture Desk, AP's image-handling system. MacArchive includes a copy of Aldus Fetch, software developed by AP to connect the system with Leaf Picture Desk, and a magneto-optical drive for storage. Besides AP photos, it can store text, graphics and sound files.

▸ **Crosfield (Canada) Inc.** released Newsline Solo, a $5,900 Mac-based wire-photo receiver and transmitter kit compatible with the Mainstream, PhotoNET and analog newsfeeds used by Reuters, AP, Agence France Press and United Press International. Newsline Solo includes browsing software, an Adobe Photoshop interface module and a digital signal processing board. Intended for daily production, it will be compatible with Crosfield's forthcoming archiving system and runs on Quadras and all Mac II machines except the IIsi.

Products such as MediaLink and NewsLink from Paralog Systems International Inc. of Sherman, Conn., and NewsEvent from National Digital Corp. of Falls Church, Va., feature Mac-based clients for image databases on VAX and OS/2 platforms.

Other Mac-based hardware and software also had a strong presence at the show. In addition to presentations by vendors such as Quark Inc., DayStar Digital Inc., Aldus Corp. and SuperMac Technology Inc., companies such as Storm Technology Inc. of Mountain View, Calif., and AXS of Berkeley, Calif., displayed Mac products targeted at photo editors.

Performance, image quality and archiving were top concerns among attendees.

"Nothing is fast enough for me," said Randall Roberts, assistant managing editor for graphics at the Albuquerque Tribune. "We won't be buying anything less than a Quadra 950 because it's horrifying running Photoshop on a Quadra 700."

Roberts said that digital images were taken mainly from AP's Leaf

See Digital, Page 34

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Font packages show new faces

Autologic readies trio of CD-ROMs

By Kirsten L. Parkinson

San Francisco — Users searching for original typefaces to liven up their documents can choose from four new font collections that offer everything from personalized signatures to Star Trek designs.

Font vendors with new typeface packages include:

▶ **Autologic Inc.,** which this month will ship three new CD-ROMs containing the company's own fonts and typefaces from Adobe Systems Inc. and Bitstream Inc.

The $99 locked version of the APS-TypeScriber disc includes 141 Autologic fonts plus the entire Bitstream and Adobe libraries. Fonts can be unlocked for $40 each.

The company also will release two unlocked discs. The first, which will list for $13,500, offers the Autologic fonts and Adobe library; the second, priced at $8,500, pairs Autologic's typefaces with Bitstream's collection.

▶ **Treacyfaces Inc.** has upgraded its entire typeface collection to support Adobe Type Manager and Adobe Type Reunion. Upgrades of packages, which contain two to four weights of a typeface, are free within 90 days of purchase. Packages older than 90 days can be upgraded for $20.

The company also released 10 new typefaces, including the sans-serif TF Akimbo and TF Guestcheck Heavy. The font packages, which are available either in Type 1 or TrueType format, list for $95 for two weights, $135 for three weights and $170 for four weights. Users can mix weights from different typefaces in a single package.

▶ **Bitstream Inc.** this month will release its first L'il Bits Type 1 fonts for the Macintosh. The first two collections will include typefaces from "Star Trek" and "Star Trek: The Next Generation" TV shows and films.

Each collection includes the typefaces used in the titles and credits as well as symbol fonts comprising crew emblems. The Star Trek package also comes with Venetian 301 and Square 721 Condensed from the Bitstream Typeface Library.

▶ **SignaFont Designs** will create TrueType and Type 1 versions of a user's signature or initials from submitted samples. A font version of a signature is $40; initials or first-name signatures are $15 each.

Autologic Inc. is at 1050 Rancho Conejo Blvd., Thousand Oaks, Calif. 91320. Phone (805) 498-9611; fax (805) 499-1167.

Treacyfaces Inc. is at P.O. Box 26036, West Haven, Conn. 06516-8036. Phone (203) 389-7037; fax (203) 389-7039.

Bitstream Inc. is at Athenaeum House, 215 First St., Cambridge, Mass. 02142. Phone (617) 497-6222; fax (617) 868-4732.

SignaFont Designs is at 1340 Dahlia, Denver, Colo. 80220. Phone (303) 355-9137; fax (303) 355-3202. □

Wraptures CD rounds out textures

By Ian G. Jacobs

San Francisco — Form and Function, based here, is shipping its second volume of seamless textures for presentations and 3-D modeling.

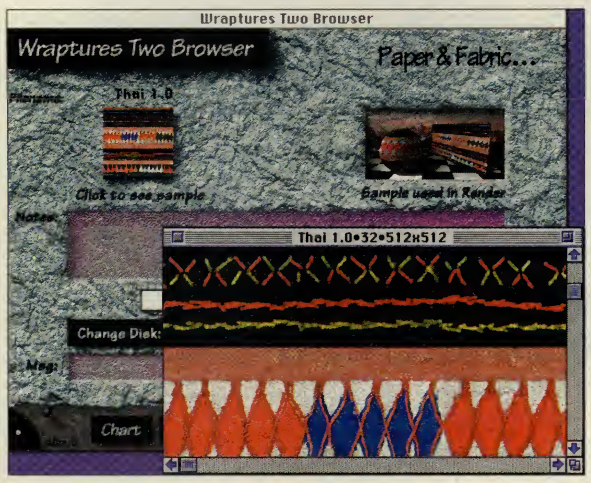
The $129 Wraptures Two CD-ROM contains more than 150 PICT textures, including jelly beans, potatoes, crinkled foil and wood grains, and QuickTime movies and animations, such as floating clouds and frothing water.

The textures come in eight-bit- and 32-bit-color versions as well as multiple resolutions ranging from 64 by 64 pixels to 1,024 by 512 pixels. A few images also are available in eight-bit gray-scale bump-map versions for 3-D rendering.

Wraptures Two includes a HyperCard-based utility that displays a thumbnail preview of each image and Imspace Systems Corp.'s PICTpocket image-browsing utility.

The disc also ships with demo versions of several 3-D modeling programs, such as Infini-D from Specular International Ltd. and StrataVision 3d from Strata Inc.

Wraptures Two is available from Educorp at 7434 Trade St., San Diego, Calif. 92121. Phone (619) 536-9999 or (800) 843-9497; fax (619) 536-2345. □



The Wraptures Two CD-ROM lets users tile textures, such as this Thai fabric, to create seamless backgrounds for presentations. The textures also can be exported to 3-D rendering programs.

CoSA offers Additional Effects for video-compositing program

By Neil McManus

Providence, R.I. — The Company of Science & Art this month released a package of new plug-in effects for its QuickTime special-effects program.

Available now for $99, Additional Effects works with CoSA's $895 After Effects program, which offers video compositing of QuickTime movies and high-quality output to videotape.

Additional Effects includes nine new plug-in effects. Bevel Edges gives a chiseled 3-D look to the edges of a video layer. Drop Shadow lets users add soft-edge shadows to layers. Ripple simulates water ripples emanating radially from any point on a layer. Other new effects include Blend, Brush Strokes, Color Balance, Ramp, Twirl and Unmultiply.

Users can change the parameters of effects over time using keyframes. After Effects also can read Adobe Premiere and Photoshop filters.

A free copy of Additional Effects will be sent to all registered users of After Effects, CoSA said.

The Company of Science & Art is at 14 Imperial Place, Suite 203, Providence, R.I. 02903. Phone (401) 831-2672; fax (401) 831-2675. □

XTensions

From Page 32

Durrant Software, enhances XPress' New dialog box with options for page size, crop marks and registration marks, as well as controls for first page number and total number of pages. It also lets the XPress Lock function lock the contents of text or picture boxes.

▶ **FaceIt,** $99, developed by a lowly apprentice production, lets users set up character-based style sheets.

▶ **TeXT Tools,** $59, developed by Vision's Edge Inc., adds features for skewing text boxes, converting uppercase letters to lowercase, and exporting all text in a document to a single file.

▶ **XT_Edit,** $199, developed by Trias, includes a stand-alone text editor and an XTension that imports the preformatted and styled text into XPress.

▶ **XMath,** $399, developed by York Graphics Inc., is a mathematical typography tool that lets users build equations in XPress. XTable, $299, is a table-composition tool. Mathable, $499, combines the features of XMath and XTable.

In addition, Scitex Corp. Ltd. of Bedford, Mass., is now shipping 12 XTensions that enhance such XPress features as alignment and measurement, zoom, lock, fractions, grids and guides, and layers. Priced from $69 to $199, the Scitex XTensions are available either from Scitex or XChange. The XTensions all feature the Scitex Launchpad, a floating palette from which they can be accessed.

XChange is at P.O. Box 270578, Fort Collins, Colo. 80527. Phone (303) 229-0656 or (800) 788-7557; fax (303) 229-9773. □

Digital

From Page 32

Desk but that he planned to begin scanning soon. "I'm still not really happy with the quality of digital-camera images, so we'll digitize the film," Roberts said.

But managing those images is an unsolved problem. "Archiving is a missing puzzle piece because the day after we start scanning, we are going to wonder where to put those images," Roberts said.

Other editors seemed to agree. "Archiving is the big issue at our site — what do we do with all these photos?" said Charles Breuer, systems editor at the News Journal in Wilmington, Del. "We're also looking at our network because QuarkXPress pages with images are hell to output."

David Nagel, Apple senior vice president and general manager of the Advanced Technology Group, stressed that the newspaper market is important not just in itself but also as an early adopter of advanced technology. "What people here do today, the real estate agents will be doing tomorrow," Nagel said.

During his keynote address, Nagel demonstrated how photo departments might work in the future. Sending a photographer equipped with a PowerBook, a wireless modem and a digital camera out into the audience, Nagel first exchanged text messages outlining the assignment. After taking a couple of pictures, the photographer returned to the podium and plugged the camera into a SCSI port on a Quadra. Nagel then set up a videoconference with another "editor" over an ordinary phone line using ShareVision Technology Inc.'s ShareView Plus, and discussed and compared different images.

The Associated Press is at 50 Rockefeller Plaza, New York, N.Y. 10020. Phone (212) 621-1796; fax (212) 621-1512.

Crosfield (Canada) Inc. is at 6500 Kestrel Road, Mississauga, Ontario L5T 1Z6, Canada. Phone (416) 670-3933; fax (416) 670-0250. □

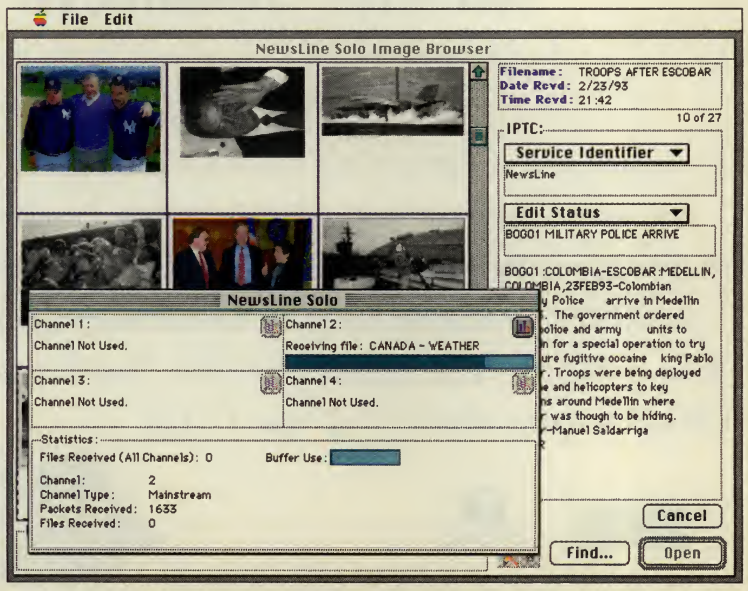


Photo editors at Digital '93 got a look at Crosfield's Newsline Solo wire-photo system. It includes browsing software that gives users thumbnail views of images found in a search.

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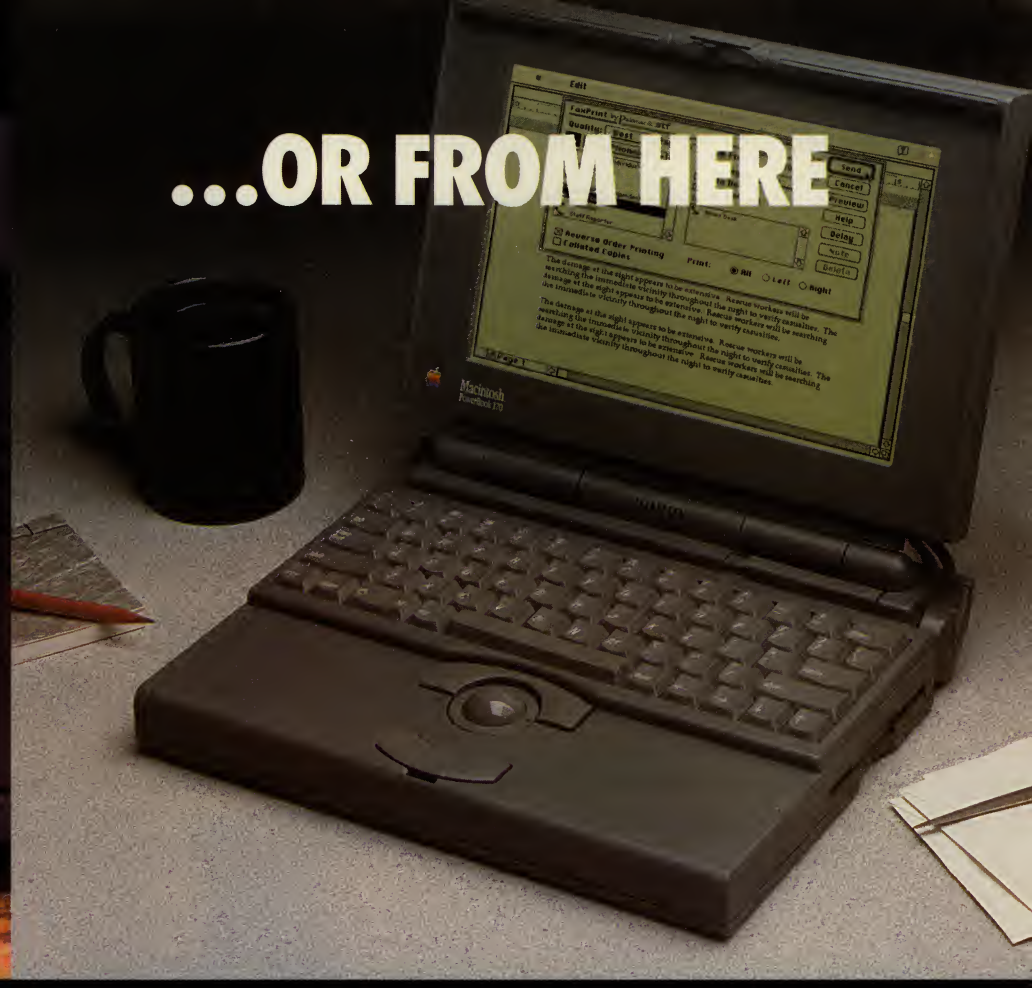

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The Refrigerator 1913

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News Analysis

Plug-ins supercharge Photoshop functions

Add-ons enhance Photoshop's image-processing powers for designers on tight deadlines and budgets.

By Charles Rubin

With the release of Photoshop 2.5, Adobe Systems Inc. has taken its image-manipulation application to a new level, offering users more speed, better image control and high-end features, such as image subsampling and improved gamut mapping. Photoshop's open architecture has always allowed third-party developers to add specific high-end functionality to the program, however, and many of Version 2.5's built-in capabilities have been available or have been surpassed for some time through plug-ins.

Plug-in enhancements to Photoshop come in three varieties: creative filters that extend the program's image-processing capabilities with new visual effects; acquire modules that let users access hardware devices or decompress files; and export modules that convert Photoshop files to other formats or print files to certain printers.

Photoshop's plug-in architecture is supported by recent versions of other programs, such as QuarkXPress; Adobe Premiere; Fractal Design Corp.'s Painter, Sketch and ColorStudio; Aldus Corp.'s SuperPaint; SuperMac Technology Inc.'s PixelPaint Professional; Strata Inc.'s StrataVision 3d; Electronics For Imaging Inc.'s Cachet; and Time Arts Inc.'s Oasis, so the money you spend on Photoshop enhancements often can be leveraged elsewhere.

Plug-in modules work the same way in Photoshop 2.5 as with previous versions, which means that users need only place the modules into the Photoshop folder for them to become active in the program.

Creative tools. While Photoshop includes an array of image-processing filters to bend, warp, blur or otherwise tweak images, designers long for more flexibility. A handful of vendors offers creative filter sets that take images where Photoshop has difficulty going on its own.

Silicon Beach Software Inc., now a subsidiary of Seattle-based Aldus Corp., created the first open specification for plug-in module technology for its Digital Darkroom image-editing program in 1988. With its expertise, Silicon Beach developed the $199 Classic Art, a collection of 16 filters that simulate traditional media such as charcoal, graphic pens and frescos in Photoshop. The second offering in its Gallery Effects series was Texture Art, 125 photographic-quality color textures of surfaces and materials developed by Pixar of Richmond, Calif.

Various filters from HSC's Kai's Power Tools were used to create an embossed background, put in a drop shadow and add chrome highlights to a sketch from Leonardo da Vinci.

Santa Monica, Calif.-based HSC Software's $149 Kai's Power Tools (KPT), developed by Photoshop expert and enthusiast Kai Krause, includes 33 specialized filters (see MacWEEK, Jan. 11). Texture Explorer lets users create an unlimited number of textures by generating and storing algorithmic descriptions of those textures. Gradient Designer lets users create gradients with up to 512 colors and includes a pop-up 24-bit-color chooser that lets users pick colors from anywhere on the screen. Spheorize puts the functionality of a 3-D ray-tracing application within Photoshop. Adobe will include several KPT filters, images and some of Krause's Photoshop tips from America Online on the Deluxe CD-ROM Edition of Photoshop 2.5.

Andromeda Software Inc. of Thousand Oaks, Calif., offers Series 1: Photography Filters, a $129 collection of 11 special-effects filters, including a filter for generating rainbows and a Mezzo filter that adds line-screen effects such as grains and dots to gray-scale images. Andromeda's Series 2: 3-D Special Effects is expected to ship in April for $129. The package will include a collection of geometric shapes, such as a sphere and cone, onto which users can wrap images and then view the shape from any angle — in a way providing a 3-D surface texture mapping application for Photoshop.

Well known in the Silicon Graphics community for its Pandemonium image processing and animation program for SGI workstations, San Francisco-based XAOS Tools will be shipping a series of creative filters for Photoshop in April. One of the filters, Paint Alchemy, which produces an array of painterly effects from impressionist to cubist, will be included on the CD-ROM version of Photoshop 2.5.

Laguna Hills, Calif.-based Second Glance is shipping Paint-Thinner and PhotoSpot, a $199 pair of filters designed to handle spot-color separations. Second Glance also has developed Chromassage, a $49 filter for colorizing images and creating psychedelic special effects. It will ship later this month.

Creative filters at work. At Texaco USA Inc. of Bel Aire, Texas, John Brock, creative services designer, produces brochures, magazine layouts and other projects using scanned photographs and drawings created in Adobe Illustrator. He uses Photoshop with Aldus' Gallery Effects and Andromeda's Series 1 filters to save production time and magnify his design possibilities.

"I can take the same photo or

SCREEN TEST

Traditional designer's use of Mac lets staff do hands-on work

San Francisco — Michael Vanderbyl considered it a "prestigious honor" to receive the commission to design the annual Stanford University Design Conference poster and be invited as a speaker.

The 1991 conference had a definite technology focus, and all of the poster's components were generated on the Mac — even though, for almost 20 years, Vanderbyl claims to have operated a "very traditional design practice and had a technical phobia against the electronic age." Vanderbyl's staff did most of the computer "hands-on work."

For the poster, Vanderbyl began by sketching concept thumbnails on tracing paper before turning production over to his staff, who scanned the designs for redrawing in Adobe Photoshop.

Vanderbyl directed the computer work, finding that he could "play with different percentages of shading" for the overlapping background fades. "Another version lost all its life when produced mechanically," he said.

Photoshop allowed Vanderbyl's designers to shade a solid silver sphere automatically and to view it in a variety of colors.

"I art-direct right at the computer," Vanderbyl said, joking that he points to the screen so frequently that his staff keeps Windex nearby.

Before hiring Macintosh artists, Vanderbyl had hired an airbrush artist to paint a series of fades and basic design elements that he could manipulate manually as clip art.

Although Vanderbyl decries "that authorless quality" of some recent computer graphics, he concedes that "it now allows designs in whole new vocabularies."

Vanderbyl said the designer must allow a problem to lead to its solution, and "Photoshop allows me another language to think in. That has changed my work.

"I was waiting for the technology to provide these opportunities. Now I won't hire anyone without Mac experience."

— By Stuart Silverstone

Illustrator drawing and give it different filter effects for different purposes," Brock said. "By distorting or colorizing an image, I can turn one image into several different ones to increase the size of our image bank with a minimum of effort."

Filters also allow Brock to produce effects that are difficult or impossible to do by hand. To create a blurred motion effect, for example, Brock used to spend one to two hours working with an Illustrator drawing. "Now, I can use Andromeda's velocity filter and do the same thing in a matter of minutes," he said.

For creative filters to produce dazzling effects, however, all that sizzle means computer-intensive processing.

Geoff Miller, digital imagineer at Capstone Studios, a design firm based in Los Angeles, said processing delays can limit an effect's usefulness.

"Some filters take too long to process," Miller said, "so their practicality is limited. Most of our files are 20 to 40 Mbytes, and we've had some situations where we applied a filter to an image globally in the afternoon and we came back the next morning and it was still processing."

Acquire modules. Often included with image-acquisition hardware, acquire modules let users drive scanners, video-capture boards and other input devices from within Photoshop; access images from sources such as Eastman Kodak Co. Photo CDs; and decompress JPEG (Joint Photographic Experts Group) files. But while these modules save users from having to switch programs to run scanners or video-capture systems, some third-party vendors add even more value.

Due this quarter for $295,

> Technician George McCollough said it took him less than a half-hour to clean up a 90-Mbyte image using FASTedit.

LineWorker from In Software of Escondido, Calif., uses Photoshop's color-conversion algorithms to convert large Scitex Linework files, which are stored in CMYK (cyan, magenta, yellow, black), into smaller, subsampled RGB (red, green, blue) index files that can be up to 75 percent smaller than the CMYK original.

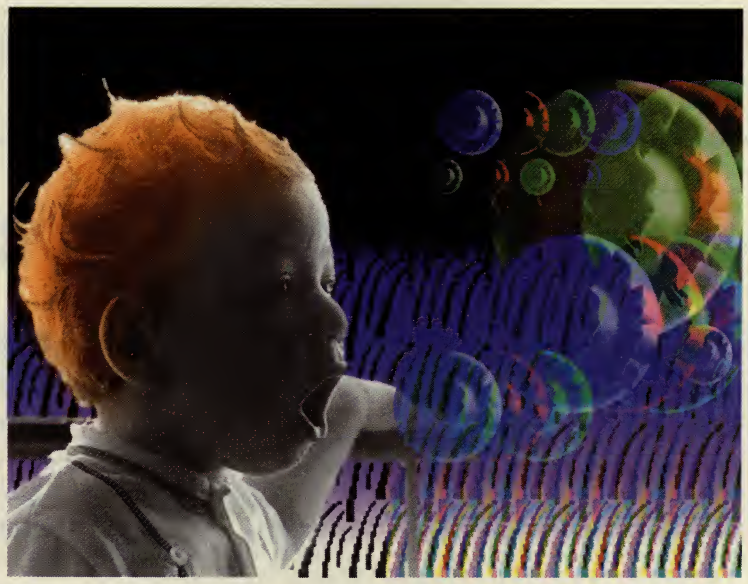
Palatine, Ill.-based Total Integration Inc.'s $239 FASTedit modules let users work more efficiently with high-resolution Scitex CT images and selectively edit RGB and CMYK TIFF images.

FASTedit lets users select part of a large image, edit the selection and then blend the selection back into place in the original image. The program's interface shows the size of a selection as you make it, and users often can select a 1- or 2-Mbyte portion of a large image.

At A.T. Publishing of Anchorage, Alaska, the FASTedit/CT and FASTedit/TIFF have saved the company thousands in RAM expansion costs and make minor edits much quicker.

"Our typical 24-bit-color image size is 40 to 50 Mbytes," said technician George McCollough, "and we edit them on a Mac IIfx with 8 Mbytes of RAM. Before, we could only place the images, really. If there was a speck of dust or a hair on an image, we'd be reluctant to clean the image up because it took so long to load the entire file into virtual memory."

Because users can select a small area, they can work with a much smaller file loaded entirely into RAM and make changes much more quickly. McCollough said it took him less than a half-hour to clean up a 90-Mbyte image using FASTedit, where it would normally have taken all day. And rather than investing thousands of dollars on more RAM for the company's Macintoshes, McCollough bought FASTedit and used the rest of the budget for an Ethernet network.



Ruth Kedar Designs created this image using Filter Prism, textures from the Designs Filter library and the cMulti Filter from Andromeda's Series 1 filters set.

For precise color calibration between a scanner's color space and the display monitor, Savitar Inc. of San Francisco offers its $199 ScanMatch filter, which determines a scanner's color capabilities, optimizes them and then matches them with the colors on your monitor so what you see has the same colors as the original scanned image.

Export modules. Export modules allow users to save images in formats not supported as standard in Photoshop, compress images in JPEG format and print images to particular printers. Photoshop comes with more than a dozen export modules for various file formats, but third-party modules add built-in image compression and enhanced control over some printers. Image-compression utilities, such as PicturePress Photoshop from Mountain View, Calif.-based Storm Technology Inc. (see MacWEEK, Jan. 25) and MacCompress from Falls Church, Va.-based National Digital Corp., save disk space without compromising image quality.

Fred Decker of J Fred Graphics, a design company based in San Francisco, said Storm Technology's $199 PicturePress application includes a plug-in that is a big help in keeping stored image sizes manageable.

Depending on the image quality setting, compressed images are a quarter to one-tenth their original size, while maintaining excellent image quality. "I have a large library of 44-Mbyte SyQuest cartridges," Decker said, "and I wouldn't be able to keep a lot of the files I have without JPEG compression. One presentation I did was three cartridges in uncompressed form, and it takes up half of one cartridge in its compressed form."

Another advantage to PicturePress is the freeware decompression utility that comes with it. "I can send compressed images to a service bureau for printing, and it can decompress them with the freeware utility," Decker said. "Instead of sending them a SyQuest cartridge, I can compress images small enough to fit on a floppy disk. I used to use [Aladdin Systems Inc.'s] StuffIt for compression, but the JPEG compression produces files that are a tenth the size of StuffIt files." □

Connie Guglielmo contributed to this report.

Photoshop 2.5 unleashes accelerators to speed tedious tasks

Adobe Photoshop 2.5 brings good news to impatient graphic designers tired of taking long coffee breaks while waiting for the program to do its thing with large color files.

In addition to a new faster performance software architecture, Photoshop 2.5 can take even greater advantage of graphics acceleration boards as part of a new "open acceleration architecture" offered by Adobe Systems Inc.

Instead of accelerating only a limited set of filters and specific functions, the next generation of "Adobe-charged" accelerators will be able to speed many of the time-consuming tasks that Adobe has identified as bottlenecks in the program, including color-mode conversion, scaling, rotations, painting, blending and applying filters.

Faster filters. Several companies — SuperMac Technology Inc. of Sunnyvale, Calif.; RasterOps Corp. of Santa Clara, Calif.; DayStar Digital Inc. of Flowery Branch, Ga.; Newer Technology of Wichita, Kan.; and Spectral Innovations Inc. of San Jose, Calif. — have been offering digital signal processor- and RISC- based accelerators that ship with specific Photoshop plug-in filters.

Most of the filters serve as replacements for filters already in Photoshop — filters such as Sharpen, Blur and Unsharp Mask. With the help of the accelerator board, the souped-up filters may operate as much as 10 to 30 times faster than the original Adobe filters. But since they were tied into the plug-in filter architecture for Photoshop, accelerator developers could offer only souped-up versions of the filters they created and bundled themselves.

The 2.5 story. As part of its new open acceleration architecture, Adobe is licensing portions of Photoshop 2.5 to hardware developers so they can develop products that accelerate many of Photoshop's image-processing functions — not just filters.

By the time 2.5 hit the streets last month, Adobe already had defined application programming interfaces for more than 300 Photoshop filters and functions from six different vendors, said Jeff Parker, Adobe Photoshop product manager.

Users and developers benefit from the new open architecture in several ways. Since the accelerators no longer operate through Photoshop's plug-in filter architecture, their operation is seamless to the user.

Accelerator developers will be able to differentiate themselves by the number of functions they address, Parker said. Vendors that already have released "function-specific" versions of boards that will tap into Photoshop 2.5's across-the-board opportunities for acceleration include DayStar, with its Charger, and SuperMac, whose Thunder II family of boards consists of 24-bit graphics cards with built-in dual DSP accelerators.

Products that currently are being updated to take advantage of Photoshop 2.5 include Image Magic from Newer Technology, RasterOps' PhotoPro (the only RISC-based accelerator among the group) and Spectral Innovations' Lightning Effects.

The software that ships with DayStar's Charger accelerator card includes a new PowerPreview feature, which lets users see the effects of running a filter before it is applied to an image.

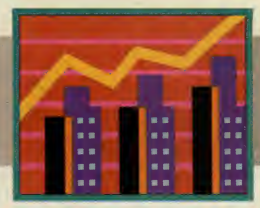
"We initially took a look at the most time-consuming functions from a production point of view and created a set of filters to address the needs of those Photoshop users," said Joe Burke, president of Spectral Innovations.

"But those people are only a small percentage of our Photoshop users. We see this new technology as a way to provide acceleration to a larger percentage of Photoshop users," Burke said. "But more exciting, Adobe has defined a new standard for addressing application-specific hardware that is transparent to the user. I see the technology opening up opportunities for hardware developers to add functionality to other software packages, including Adobe's own Premiere."

— By Connie Guglielmo

BUSINESS WATCH

- Industry news
- Market trends



Radius pins hopes on newest CEO

Berger third to take helm in two years

By Lisa Picarille

San Jose, Calif. — The third time's the charm.

Radius Inc. is hoping the adage is true. Last week the Mac peripherals maker named its third CEO/president in two years.

Chuck Berger takes the Radius helm after less than a year at Claris Corp. as senior vice president of worldwide sales, operations and support. Previously, Berger had been a vice president at Sun Microsystems Inc. and before that put in six years at Apple, where his roles included treasurer, vice president of business development and general manager of integrated systems.

Berger replaces Mike Boich, Radius co-founder, president and CEO, but Boich retains his position as chairman of the board. "Mike is still a full-time Radius employee," said Dee Cravens, director of marketing communications. "His role will be to provide more visionary leadership. He prefers that to dealing with day-to-day operations."

Boich reluctantly stepped back into the president and CEO slot last September when Barry James Folsom left after 18 months on the job.

Berger will take over a company that has posted lower-than-expected earnings in each of the past two quarters (see MacWEEK, Jan. 4). He faces the challenge of managing a product line and development program that some industry watchers describe as unfocused, and in particular, shepherding the company through the introduction of a major new product.

"Radius seems to have a strategy du jour mentality," said one source close to the company. "One day [Radius] is attempting to take over the desktop video world, the next it's trying to revolutionize high-end color publishing, the day after that it's focusing on its Pivots. Now it seems [Radius] is throwing all its resources into going after Sun and Silicon Graphics."

See Radius, Page 42

Radius Inc.

- **CEO and president:** Chuck Berger
- **Founded:** 1986
- **Headquarters:** San Jose, Calif.
- **1992 revenues:** $159 million
- **IPO:** 1990
- **Employees:** 500
- **Major Mac products:** Pivot monitors, VideoVision video-production systems, Rocket 040 accelerators, RocketShare multiprocessing software

Dealers mull Apple warranty plan

By Jon Swartz

San Francisco — Apple dealers, facing potential service and support competition from Apple on several flanks, may not be left out of future warranty plans after all.

The company's new warranty service, which will be provided by third parties, offers free one-year, on-site support for desktop Macs sold in the United States, sources said. The plan is expected to be announced this spring (see MacWEEK, March 1).

"[Apple] can't leave us out," said one dealer briefed on the warranty plan. "They realize they don't have the resources or the multivendor knowledge to implement the plan without our help."

In addition, Apple is considering a new service authorization for its resellers called the Apple Authorized Service Provider (AASP), sources said.

The authorization plan, modeled after an IBM Corp. program in use, aims for four-hour response time and a two-day turnaround on repairs. AASPs will be responsible for on-site service within a 60-mile radius and reimbursed $50 per call by Apple for Apple-specific repairs. The plan, which is being finalized, is expected to be announced this month.

Apple also reportedly is considering offering service authorization to companies that do not resell Apple products. Apple declined to comment.

Dealers, many of which offer service and support to compensate for shrinking profit margins, are taking a cautious approach about Apple's proposed plans. "We want to maintain good service to our customers, and we hope Apple has us in their plans," said Clay Anderson, general manager of Connecting Point of America Inc. in Plaistow, N.H.

Apple has shown a willingness to tweak channel strategies that initially hampered dealers. Anderson said dealers were outraged by Apple's initial decision not to allow them to service Performas, before the computer maker backed down and lifted the restriction under certain conditions.

An Apple dealer in the Northeast said Apple is likely to retain a significant number of dealers to provide some form of service — particularly those with networking, system software and cross-platform expertise. "It would be suicide for Apple to

See Warranty, Page 42

Tektronix claims imaging patent

By Jon Swartz

Wilsonville, Ore. — Tektronix Inc. has laid claim to a patent on video-imaging display software that if upheld could affect a broad range of products in the fledgling multimedia market.

In a letter to nearly a dozen multimedia developers, including Apple, Microsoft Corp. and Adobe Systems Inc., Tektronix claims it has a 1990 patent on software that uses indexes to display video images. That category would cover such technology as QuickTime and Video for Windows applications.

The company, based here, is seeking unspecified licensing fees for the patent, which it says was

See Patent, Page 42

Apple Seed program to plant software in volume users' hands

By Raines Cohen

Austin, Texas — Sunset Direct next month is expected to announce a free program for Mac software developers that promises to put evaluation units of their products in the hands of volume buyers.

Under the Apple Seed program, participating U.S. vendors would contribute 35 not-for-resale copies of their products, which Sunset would pass along to Apple's domestic field-sales offices. Apple salespeople would then evaluate the products and show them to sites that are considering purchasing Macs.

Sunset is working with Apple on a promotion for the program, said Sunset President Doug Monahan.

Sunset Direct, a marketing co-op of Mac and IBM PC-and-compatible developers, was formed here last year. It has more than 100 hardware and software vendor members, including Radius Inc. and DayStar Digital Inc.

Sunset contacts potential Mac volume buyers, including customers who receive Macs for evaluation through Apple's U.S. field-sales offices. The company sends buyers a survey to determine the size of their potential purchase and their areas of interest. It then collates the results and sends leads to its members, which ship evaluation copies of products directly to the potential buyer.

Buyers can specify the dealer and representative they want to buy from, and Sunset forwards that information to resellers.

Monahan said that because Sunset is funded equally by its members and receives no commissions, it promotes all products equally.

Sunset Direct is at 6010 Balcones Drive, Suite 150, Austin, Texas 78731. Phone (512) 458-9270; fax (512) 458-9279. □

StockWatch

	03.03.93 CLOSE	WEEKLY % CHANGE
Apple	54.63	1.86
SOFTWARE DEVELOPERS		
Adobe	44.75	5.29
Aldus	18.50	3.50
Caere	18.75	7.14
CE Software	4.00	6.67
Microsoft	84.75	1.04
Novell	30.00	12.68
Symantec	9.88	-9.20
PERIPHERALS VENDORS		
CMS	2.13	-19.05
HP	76.00	1.67
Mass Micro	0.41	-13.43
QMS	14.63	-0.85
Radius	4.63	-9.76
RasterOps	7.50	0.00
Sigma	6.00	0.00
SuperMac	17.00	1.49
STORAGE		
Conner	17.50	-9.09
Maxtor	7.63	1.67
Quantum	15.88	-4.51
Seagate	15.88	-4.51
SyQuest	11.88	17.28
INDUSTRY INDICATORS		
DEC	47.13	0.53
IBM	55.25	6.51
Motorola	60.00	2.56
Sun	35.50	2.53
Dow Jones	3404.04	1.42

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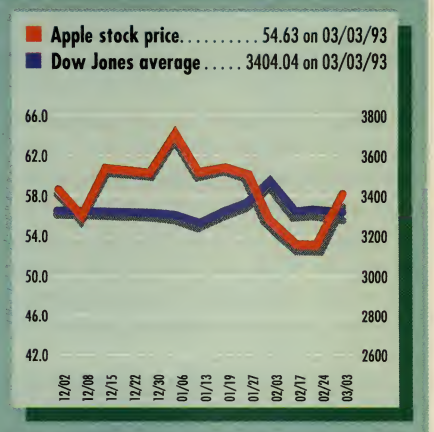

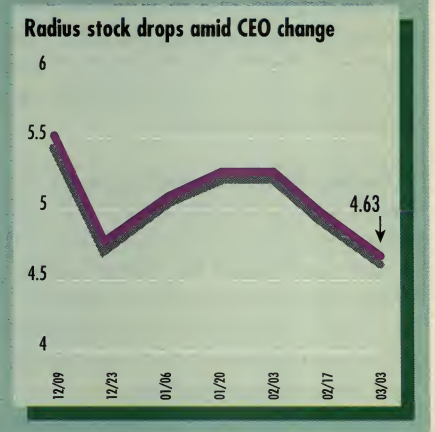

Radius Inc.'s appointment of Chuck Berger as its third CEO and president in two years didn't fare well among high-tech investors last week (see story above).

The San Jose, Calif.-based peripherals company's stock slipped nearly 10 percent to close at $4.63 per share. Berger, a former executive of Apple, Claris Corp. and Sun Microsystems Inc., replaces Mike Boich, who remains Radius' chairman.

When a company reaches maturity, it tends to fill out a bit.

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Patent

From Page 40

acquired by its Grass Valley Group Inc. subsidiary. Tektronix did not set a fee deadline in the letter.

"This goes to the fundamental nature of every program that displays images in a random fashion," said Tony Bove, editor of the Bove & Rhodes Inside Report on Multimedia and Publishing Technologies in Gualala, Calif. "The effects would be staggering if it's proven."

But multimedia software vendors say the claim is unfounded. "I'm in disbelief. It's ludicrous," said Eric Shapiro, president of Rock Ridge Enterprises, an Ann Arbor, Mich.-based maker of indexing software for video software from Sound Source Inc. "The technology has been around for a decade."

Intel Corp., Adobe and Radius Inc., all of which received the letter, said they have not infringed any patents. Apple and Microsoft declined to comment.

Herb Hammond, a patent attorney at Gardere & Wynne in Dallas, said the patent could be invalidated if a company or individual provides prior art, such as a multimedia presentation or video clip, that used video-indexing technology before the patent was filed in 1990.

Tektronix acknowledged it has sent the letter but declined to comment further. □

Warranty

From Page 40

ignore its dealers and rely on independent service companies," he said.

A large number of companies already offer on-site service, including ComputerLand Corp. of Pleasanton, Calif., and JWP Inc. of Rye Brook, N.Y., and most resellers provide full service.

Industry observers claim Apple simply is shoring up its hardware support as IBM, Compaq Computer Corp. and Dell Computer Co. have over the past year. Indeed, computer reliability has made service and support a relatively inexpensive proposition — even as warranties are being extended to cover up to three years.

"On the surface it appears Apple is intruding. But as you peel back the onion, you see that they're moving into an established market," said Stephen Clancy, associate director of desktop support services for Dataquest Inc. in Framingham, Mass.

Still, hardware support is increasingly important as computer prices and features among major vendors begin to blur.

"A three-year warranty builds customer loyalty. That's good news in the current climate of PC price wars," Clancy said. □

Radius

From Page 40

Radius officials are adamant that the company's core products — monitors, accelerators, display cards, desktop video products and RocketShare distributed-processing software — are all parts of a coherent strategy. They say the company's focus will become clearer in the next six months — an apparent reference to the forthcoming introduction of a high-performance media server.

Code-named SkyLab, the Radius-designed box reportedly has slots for up to eight Rocket accelerators and support for up to 20 Gbytes of storage. The product depends on code licensed from Apple (see MacWEEK Jan. 18).

Slated to ship this summer, SkyLab is expected to play a key role in Radius' future. Sources said the company is betting heavily that SkyLab's power will rival high-end offerings from Sun and Silicon Graphics Inc. for just one-fifth the price of those workstations.

Sources said Radius estimates the product could double the company's revenues, which were $159 million in fiscal 1992.

Radius declined to comment on the product.

The SkyLab project now is the responsibility of Ed Colligan, director of marketing and sales for Radius' systems division. Colligan took over for Hugh Hempel, who left the company last month after just seven months.

Sources said SkyLab, which has been under development for almost two years, has become a significant drain on the company's resources. Radius officials deny the charges, but Cravens admitted that the company has experienced a "stretch-strain" period recently.

"As you move toward multiprocessing products, you have to make decisions on where you should apply engineering talent," Cravens said. "There is a tremendous commitment that has to be made, but six months from now, the stretch-strain will be over."

But timing is a major concern. "The concept of what Radius is doing is a positive move," said one source. "But it will have very serious problems financially if it is late — which means [Radius] will have to deliver by the fall or not later than the end of the year."

While gearing up for SkyLab, Radius has quietly reduced its commitment to some other projects, according to sources.

The bulk of Radius' PC display engineering staff left in December after Radius licensed its PC-Pivot card software to Portrait Display Labs, a Fremont, Calif., start-up. A strategic alliance between the two companies is expected to be announced next month.

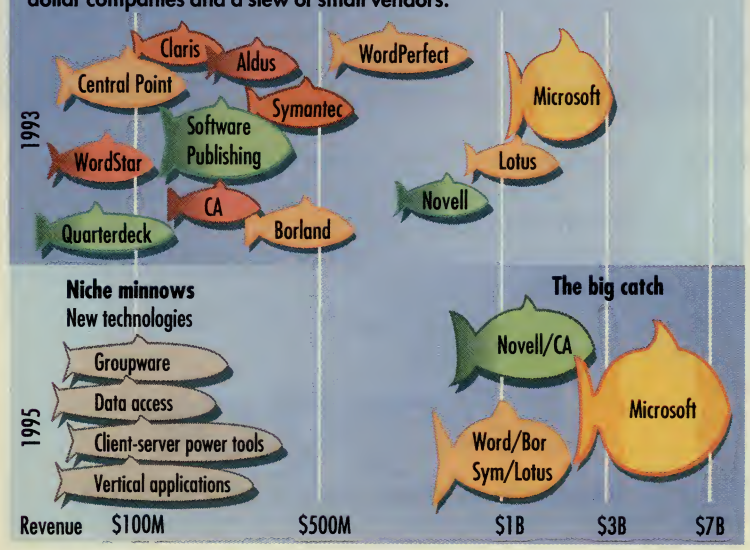
Most industry watchers agreed that Radius, which derives an estimated 55 percent to 65 percent of its total revenues from monitor sales, needs to transition its business to higher-margin products.

"Competitive pressures are making glass a commodity item and the margins on monitors are just getting lower and lower," said one analyst. "You better have something else up your sleeve if you want to be around in five years."

Ben Houston, an analyst with Pacific Growth Equities, a San Francisco-based investment banking firm, said: "I feel very positive about the direction of the company. Now it may look dire to outsiders, but in six months we'll know better and things will be moving in a very positive direction." □

MacWEEK index
MERGERS TO HIT DESKTOP SOFTWARE

A recent survey of 52 Fortune 1,000 companies concluded that the desktop market will consolidate significantly by 1995, resulting in a handful of billion-dollar companies and a slew of small vendors.



Source: Forrester Research Inc.

Business BRIEFS

Farallon trims work force by 10 percent

Alameda, Calif. — Farallon Computing Inc., citing mounting margin pressure in the networking world, last week laid off about 10 percent of its work force.

Officials of the company, which previously had nearly 250 employees, said the reduction was spread across all departments, including engineering, marketing, sales and operations.

"We're going through something like what Apple went through as it moved into lower-margin products," said Steve Holtzman, vice president of marketing. "We are trying to be proactive about structuring ourselves to stay competitive in the market we're in."

WordPerfect closes subsidiary, forms new division

Orem, Utah — WordPerfect Corp. last week announced the closure of Reference Software International Inc., the writing-tools company it recently acquired, and the formation of a new consumer division.

WordPerfect's new Consumer Products Group, which will be based at the company's headquarters here, will handle sales and marketing of low-end products. Jeff Mallett, former vice president of sales and marketing for Reference, heads the group.

Reference's San Francisco offices were closed last month, and some employees have been relocated to Orem, according to WordPerfect.

Conner expects dip in profits

San Jose, Calif. — Conner Peripherals Inc. last month said it expects lower profits despite a rise in sales.

The disk drive maker expects profits in its first quarter ending in March to fall short of the $44.2 million that it posted in the fourth quarter ended Dec. 31, 1992, even though its sales are expected to top the $620.5 million in that quarter.

Conner, based here, blamed the earnings dip on declining prices of older-model disk drives and on costs associated with the development of new products.

The company also announced that Carl Neun, its chief financial officer, will leave this month to take a similar position at Tektronix Inc. of Wilsonville, Ore. David White, Conner vice president and corporate controller, will act as interim chief financial officer.

IBM veteran joins Taligent board

Cupertino, Calif. — Taligent Inc. last week announced that Jack Kuehler, vice chairman of IBM Corp., has joined its board of directors.

The board includes Taligent CEO Joseph Guglielmi; Joseph Graziano, Apple chief financial officer; Richard Guarino, vice president of Apple Alliance at IBM Personal Systems; and David Nagel, head of Apple's Macintosh Software Architecture Division.

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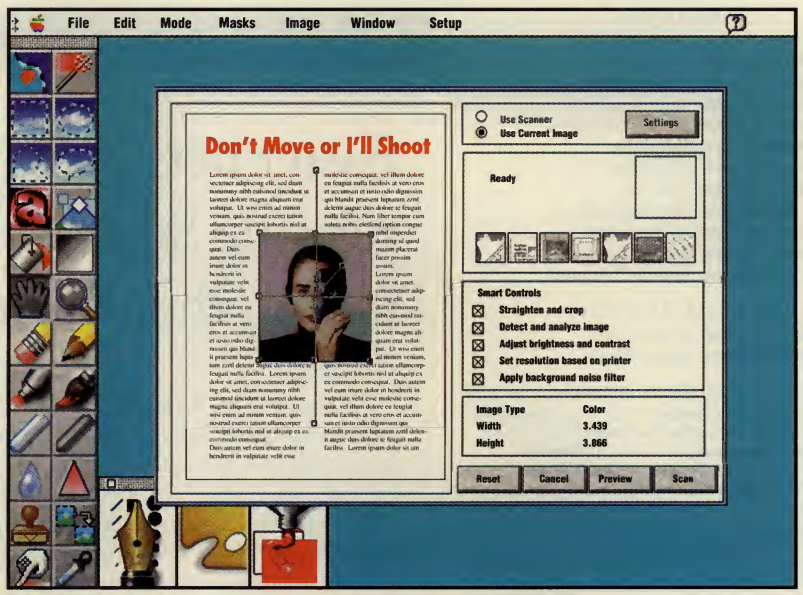

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BPA

EDITORIAL

Technology alone won't fix economy

Everyone from President Clinton to Apple CEO John Sculley has been talking up the rebuilding of U.S. business through the enlightened application of technology. Computers these days are viewed not as a tool but as a mechanism that creates jobs almost reflexively.

But the time has come for a revolution in human resources, too. Investments in technology will pay few returns if workers aren't given the training to use it and, more critically, the opportunity to innovate on their pre-technology job descriptions.

Remaking the information infrastructure to reassert the business structures lived by the man in the gray flannel suit during the 1950s would be a waste of time and money.

Electronic mail and group scheduling have succeeded in automating phone tag and the paper calendar. Word processors and spreadsheets have replaced typing and working numbers with a calculator and the prehistoric adding machine of only 30 years ago. Collaborative software has even appeared to take the place of the corporate mail room.

Now people must find something better to do with their time. It's the moment to create a new kind of organization. Computer users, especially those who purchase technology for their companies, should press the argument that network communications is a platform for new kinds of business structures, not just better office automation.

If corporations don't think of some innovative ways for people to create value, very soon they will be running virtually on automatic. But without gainful employment for a large part of society, even gigantic multinationals will fall for want of markets for their refrigerators, automobiles and laundry detergent.

The challenge of the era is not to create high-skill, high-wage jobs in support of computer technology, but to imagine novel work that uses technology to inject radically different kinds of human-added value into products and services. □

Commentary

Faster nets could relegate Sun, SGI to the ether world

JEAN-LOUIS GASSÉE

After years in the darkness shared by other techie topics, networking has at last entered the limelight. Data superhighways are now evoked on CNN, and words like wireless and ISDN have fallen into the common parlance of executives everywhere.

Understandably, some not-so-sexy advances have been lost in the mainstream media's recent techie focus. Fortunately, relevance generally wins over exposure.

Warp 100, Mr. Scott. One such silent networking revolution is high-bandwidth Ethernet that jumps from current Ethernet's 10-Mbps to 100-Mbps throughput.

To put 100-Mbps Ethernet in perspective, the 80-Mbyte hard drive in your desktop Mac provides throughput of about 8 Mbps. Only with the best in high-speed Fast and Wide SCSI arrays is it possible to get into the 100-Mbps range. In other words, networks will soon deliver data faster than hard drives.

What's especially nice about 100-Mbps Ethernet is its cost. A group of companies led by 3Com Corp. is working on a 100-Mbps standard that will use the same wiring and software drivers as the 10-Mbps standard. All you need are new adapters.

When these adapters appear in a year, most will offer both standard and 100-Mbps interfaces for about $250. The only sacrifice is network length, which will be reduced to a maximum of a few hundred meters.

Other groups are proposing alternative 100-Mbps Ethernet standards. One, headed by Hewlett-Packard Co., is promoting an approach that is not compatible with existing Ethernet but offers the advantage of isochronicity.

In short, an isochronous network is sensitive to the bandwidth requirements of different data types and, therefore, can increase *effective* throughput. So when a QuickTime movie is played over the network, HP's Ethernet clears the line, reducing the chances that an interruption will degrade the movie's performance.

Bird on a wire. Whether HP's faster effective throughput or 3Com's more compatible solution wins, an order-of-magnitude increase in speed will foment some major changes in computing. Bandwidth-hungry network applications, such as Farallon Computing Inc.'s Timbuktu, could become commonplace. Also, if you can interact with the network faster than you can with your hard disk, you might want to spend more time on the wire. Distributed processing starts making a lot more sense.

So far, "media-rich" programs have run well on local machines. However, LANs could not cope with this data in "real time," reducing the use of digital video, for example, to a solitary pursuit.

Will this change with faster networks? Are we going to see a huge migration to open systems, which rely on fast LANs and the diskless workstation? To a limited extent, perhaps, but not on a massive scale.

I would venture to say that cheap, 100-Mbps Ethernet together with more-powerful microprocessors and more-robust operating systems will cause personal computers to make further inroads into the workstation market. Even the most workstation-dominated IS department will have a hard time arguing against these supercharged personal computers, which will offer the speed of a SPARCstation and the application base of a personal computer all in an inexpensive package.

High-speed Ethernet may not represent the death knell of Sun Microsystems Inc. or Silicon Graphics Inc., but it could mean more companies will rely on personal computers for jobs currently handled on workstations. □

LETTERS

CL560 chip development is on course for midyear

The Mac the Knife column (MacWEEK, Feb. 8) stated that C-Cube Microsystems will not sample the CL560, our next-generation JPEG (Joint Photographic Experts Group) compression processor, until July and that customers won't introduce systems until year-end.

The fact is that we have already delivered first silicon of the CL560 to customers who can use the chips now, and we expect to be in production in the second quarter.

Scott St. Clair
Manager, corporate communications
C-Cube Microsystems, Milpitas, Calif.

10BASE T Ethernet solutions the better LocalTalk choice

I was quoted in the Gateways story "Switching answers call for faster nets" (MacWEEK, Feb. 15). I feel I was inaccurately quoted and would like to clarify my opinion on the issue addressed in the story.

I was quoted as saying, "In smaller LocalTalk LANs, I don't think [LocalTalk] is an economical alternative to 10BASE T." This statement, as printed, makes no sense. I had originally used the word "it" in the quote, and you inferred that I was referring to LocalTalk. In fact, the "it" to which I was referring was a LocalTalk switching device, not LocalTalk itself as a connectivity solution.

This is the overall thrust of my opinion: I do not see the economic benefit of going with a LocalTalk switching device over 10BASE T Ethernet for those looking to move from daisy-chain LocalTalk topology to a star-wired network topology. This is because the cost of 10BASE T Ethernet is dropping so rapidly.

There are places on a network for switching devices and places for a router. Too often I've seen switches put in place where a router is needed to do the job. Maximizing throughput and segmenting networks are not two mutually exclusive goals, although this seems to be the thought of some communications professionals.

In fact, the segmenting of a network is a tool often used to try to maximize throughput, a point that I think Jay Batson of Cayman Systems Inc. was trying to make in the story. Putting switching devices in a network in the proper places is another tool that can be used to work toward that same goal.

The caution that I was trying to offer was this: Before looking for a solution, whether it be a router, bridge, hub or switch, as much research and analysis needs to be put into which solution will best fit a user's connectivity needs as was devoted to the selection of the desktop system itself.

Philip Kearney, network engineer
Falcon Microsystems Inc., Landover, Md.

Longtime HyperCard critic: Stop defending, start fixing

For some time I have badgered Apple CEO John Sculley and others at Apple to dump HyperCard, once precipitating an AppleLink flood from dozens of annoyed Apple employees. By many measurements, HyperCard is a failure.

HyperCard was born swimming in hype about replacing programmers with the ultimate programming tool that anybody could use. Being a programmer more by default than design, I anticipated that promise more than anyone. But HyperCard failed miserably.

When compared with something such as Symantec Corp.'s Think C, the programming environment in HyperCard has always been severely crippled in features as well as performance, much as many programmable relational databases. As a result, using Claris Corp.'s FileMaker Pro is a better solution despite its limitations.

Part of the problem is that Apple suffers from short-term hype orientation. It gets very excited about a new idea, pushes it with the "get it right the first time" syndrome, then fades away when the dream doesn't materialize. Bill Atkinson dropped HyperCard as soon as something more fun came along.

Look at Microsoft Corp. and Windows as an example of persistence. Microsoft kept producing new versions of Windows until it got it right. (I do, however, find it hard to use "right" to describe anything about Windows.)

If Apple wants HyperCard to be a success, it has to stop being defensive about criticisms of it and start solving the problems. Most of all, it has to stick with it until it gets it right.

Kim Hunter, owner, Acropolis Software
Mission Viejo, Calif.

New Contact Ease 2.0 is at least 500 percent faster

The story "WestWare speeds Contact Ease, adds synchronization feature" (MacWEEK, Feb. 22) overall was accurate, but one statement needs correction. The story states that Contact Ease 2.0 is 5 percent to 40 percent faster than the previous version, when in fact the new version is five times to 40 times faster.

This dramatic speed increase is the result of the use of Sierra Software Innovations Inc.'s Out II database engine.

Walter M. Venable
Vice president, product development
WestWare Inc., Spring Valley, Calif.

Send letters to MacWEEK, 301 Howard St., 15th Floor, San Francisco, Calif. 94105. MCI 323-1203; Internet, letters@macweek.ziff.com; fax (415) 243-3650. Include your name, address and phone number. Letters should not exceed 300 words. We reserve the right to edit for clarity and length.

The Mac Manager

Try a three-step program to overcome Mac centricity

DON CRABB

As some of you know, I am involved with a syndicated television show about computers. I'm learning a lot about TV, but the most important lesson I've learned so far isn't about TV but about the Macintosh.

I've learned that even the best Mac video solutions are severely limited, even crude, when compared with broadcast-quality video equipment.

Some of you may have known this for a long time, but many of you may be as surprised as I was to learn the same lesson, especially when it's applied to the specifics of your shop.

Frankly, this lesson shocked me. I had just *assumed* that any Mac-based stuff had to be as good, if not better, than what it purported to replace.

A process defined. As it turns out, what I had stumbled across was my counterproductive tendency to believe that any Mac solution is better than any non-Mac solution, be it stand-alone (such as broadcast TV) or other computer-based solutions (such as those found running under DOS, Unix, OS/2 or, soon, Windows NT).

A little self-examination revealed that I was not a cult of one in this Macintosh hubris. Indeed, what I have discovered may be one of the most important strategic problems facing Mac managers.

When was the last time you considered a noncomputing solution to a problem in your shop?

When was the last time you took a good look at a computing solution that involved non-Mac hardware or software?

When was the last time you even bothered to read what is going on in the non-Mac computing world?

The feedback I have gotten from my Mac manager network is not encouraging. Too few Mac managers bother to take the time to peruse what's happening in the world outside of Macintosh. Fewer still devote the kind of time needed to evaluate properly a non-Mac product or even consider the possibility that a noncomputer solution is the right one.

As a result, a significant number of Mac managers are in danger of falling into the same trap to which Apple is prone — the Not Invented Here Syndrome (NIHS).

The simple solution is to start paying attention to the strategic big picture — to begin to seek out non-Mac and possibly noncomputer solutions as readily as you do Mac-based solutions.

But that's hard to do. All of our Mac training and biases argue against pushing NIHS aside.

New attitudes. Still, we must recognize the problem, which can be a blow to the ego. Then we must decide to spend time, effort and money on fixing it, which is a blow to the budget. Finally, we must get some outside help and perspectives, which can be a blow to both our self-esteem and budget.

But taking a few on the chin now will help us defeat NIHS in the long run. Try beginning with these steps:

- Pay attention to people in your shop who do not use computers to see if they can give you new insights into your problems and needs.
- Make a habit of meeting with your non-Mac computing colleagues and encouraging their feedback.
- Do the unthinkable. Join a non-Mac user group and open your mind. □

"Sorry, my training is only in data retrieval."

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Reviews

- Transportable MultiDisk 150. See Page 49.
- DATDisk. See Page 50.

Streamlined Painter upgrade offers a new stroke of genius

Fractal's 'natural-media' painting program adds many features and refinements.

By Philip Bishop

Fractal Design Corp.'s Painter, a show-stopping "natural-media" 24-bit-color painting program, has overcome nearly all of its earlier limitations with Version 2.0. The new edition has more than 70 new features, including more flexible color palettes, type support, a bank of image-editing tools, stunning new painting tools and a refined interface.

The program's retail price has risen from $349 to $399.

Painter achieves best results when teamed with a pressure-sensitive drawing tablet, such as those available from Wacom Technology Corp., CalComp Inc. and Kurta Corp. These tablets are not required to use the product, however.

Finger paints. Painter 2.0 has almost a dozen enhancements that make it easier to use. Brush Variants, Paper Textures and Brush Looks palettes now tear off and can be placed anywhere on your screen for easy access. (Brush Looks, a new feature of Painter 2.0, is a visual catalog of Brush Variants.) Palettes in Version 2.0 also can be hidden or closed to give you more working room.

An important enhancement to the program is a preview window in many dialog boxes, such as Apply Surface Texture, that shows the results of filters, special effects and other techniques on an image before you apply the effect.

One enhancement we particularly like is being able to work in full-screen mode. Using this feature, your work area is no longer a floating window but fills the entire screen. With palettes hidden and a couple of selected torn-off tools placed around the edges, there are fewer distractions and a much keener connection between you and your work.

Brisk Friskets. Fractal's Frisket masking technology has matured a great deal in Painter 2.0. The most important changes are that you now can edit Friskets, and you can use type and imported Encapsulated PostScript outlines as Friskets.

You have a choice between free-form and straight-edged Friskets (in earlier versions only free-form masks were available).

The simplest way to edit a Frisket is to use the Frisket Knife Tool and, holding down the Command or Command-Option keys, draw the new Frisket line that you want to add or subtract. This is a natural editing method, particularly for artists used to holding a brush or stylus. Designers accustomed to the Bezier editing tools in Aldus FreeHand or Adobe Illustrator, however, might find Painter's Frisket-editing methods harder to use.

For artists using multiple applications, you now can import EPS art as Friskets (through the Palette Library function). Painter ships with a library of predefined

Painter 2.0 features more and improved brushes and masking tools. Type now can be used as a Frisket; color palettes can be stored and flipped through like book pages; and brush strokes, even whole painting sessions, can be previewed, recorded and played back.

Friskets, such as stars and geometric shapes. You also can import images from Fractal's ColorStudio and Adobe Photoshop and retain their mask layer as a Frisket.

You also can overlap two Friskets and then choose to have them treated as a single outline or as subtractive (one shape taking a bite out of the other). These actions can be performed with keyboard controls or by clicking on new buttons added to the Frisket palette. With other keyboard controls, you also can create Friskets with holes in them. With Painter 2.0's new Pointer Tool it's a snap to move, resize, rotate and copy Friskets.

The Magic Wand tool can be waved over a range of colors to mask all matching colors.

See Painter, next page

RATINGS KEY

- ◆◆◆◆◆ *Excellent*
- ◆◆◆◆ *Very good*
- ◆◆◆ *Good*
- ◆◆ *Fair*
- ◆ *Unsatisfactory*

score card

Painter

Fractal Design Corp.
Version tested: 2.0
List price: $399*
Overall value ◆◆◆◆

Painter, Fractal Design Corp.'s 24-bit-color painting program, is still a show stopper with rich tools and textures, and it is now more useful in the working world. The update has more than 70 new features, including a bank of image-editing tools; more stunning painting tools; a refined production-oriented interface; and support for type, Encapsulated PostScript outlines and Photoshop plug-ins. While Fractal has fixed most of the major problems, the program lacks Undo capabilities in Friskets, and many time-consuming operations cannot be aborted. With a few adjustments, Painter 2.0 will become a truly excellent product.

Performance ◆◆◆◆
Features ◆◆◆◆◆
Ease of use ◆◆◆◆
Documentation/support ◆◆◆

** Upgrade from Version 1.0, $79; free if purchased after Nov. 1, 1992.*

Speedy Phaser 200 series excels on plain paper

Tektronix line pairs low cost, fast color

By Bruce Fraser

Tektronix Inc.'s Phaser 200 series of thermal-wax printers succeeds the popular Phaser IIPX line, featuring lower prices and a faster engine. But the real breakthrough in the 200 series is the ability to print on a wide variety of plain papers, thanks to Tektronix's patented ColorCoat technology. This, combined with strong performance on overhead transparencies, makes the 200 series very attractive for general business use.

The 200 series printers are strictly three-color — cyan, magenta, yellow (CMY) — which for the moment makes them less suitable for the graphic arts markets. However, forthcoming device profiles for Apple's ColorSync, Electronics for Imaging Inc.'s EfiColor and Eastman Kodak Co.'s KCMS color-management systems may change that.

Two pieces of the pie. The entry-level $3,695 Phaser 200e has 17 built-in fonts, upgradable to 39 via a $595 font SIMM, and it ships with 4 Mbytes of RAM, upgradable to 8 Mbytes. It features LocalTalk, RS-232 serial and Centronics parallel interfaces.

The $5,995 Phaser 200i has a faster AMD 29000 RISC processor (24 MHz vs. the 200i's 16 MHz), 6 Mbytes of RAM (upgradable to 14 Mbytes), 39 fonts and a SCSI port

See Phaser 200, next page

score card

Phaser 200i

Tektronix Inc.
Overall value ◆◆◆◆ **List price: $5,995***

The Phaser 200i is a successor to the popular Phaser IIPXe and PXi thermal-wax printers. It features the same speedy RISC-based PostScript Level 2 interpreter as its predecessors, but it uses a new, faster, 2-page-per-minute engine that prints on plain paper using patented ColorCoat thermal-wax ribbons. The color it produces is pleasing rather than accurate, making both the 200i and its lower-priced sibling, the $3,695 Phaser 200e, more suitable for general business use than for the graphic arts market, but device profiles for color-management systems could change that. A well-rounded set of optional extras makes the Phaser 200i attractive as an all-around business color printer.

Performance ◆◆◆◆
Features ◆◆◆◆
Configuration ◆◆◆◆
Compatibility ◆◆◆◆
Documentation/support ◆◆◆◆

** Lower tray option, $495; plain-paper kit (tray, perforated laser paper, ColorCoat roll), $195; 4-Mbyte RAM upgrade, $495; EtherTalk interface (200i only), $695; TCP/IP interface (200i only), $1,495.*

Painter

From previous page

Painting type. One of our biggest gripes with Painter 1.0 was its lack of type support. In Version 2.0, you can use type as Friskets. To access this feature, you must first import a Type 1 or TrueType font through a dialog box, a process that isn't as easy as simply pulling down a font menu. The letters you type in the work area appear as a Frisket and can be manipulated with Painter's tools. Unlike Sketcher, Painter's gray-scale sibling, aligning type is possible using a new, editable grid function. You also can move, squash and stretch individual characters of a word. While the type support is very good, Fractal needs to boost it with more controls (such as automatic alignment and kerning).

In general, the new masking tools are much improved. Our primary complaint is that you cannot undo changes. Since much of Painter's power is derived from Friskets, this is an unforgivable omission.

Pleasant production. Fractal has responded to the demands of production artists by adding a wealth of other image-processing tools and support for Photoshop plug-ins. Under the new Effects menu, you will find common image-editing features such as resize, equalize, highpass, posterize, sharpen, soften, motion blur, scale, distort, and flip horizontal and vertical. The program now can print color separations to any PostScript device and can produce color separations with good control over separation parameters, such as dot gain and screen settings.

Recording artist. Painter can record single brush strokes and even entire painting sessions. Options let you replay brush strokes in multiple locations with different colors to create patterns, for example.

The Record Session command is extremely powerful: You can create a painting and replay all of the strokes using a variety of Papers and other settings. Or you can create a painting at screen resolution, which greatly speeds Painter's responsiveness, and then play it back at high resolution for final output.

> Apply Lighting is one of the most exciting features added to Painter 2.0. This lets you do "2.5-D" rendering.

The Brush Stroke Designer palette lets you preview a Brush Variant much like a scratch pad. You can record a stroke and then play it back on the canvas with the playback controls. You can click on the canvas to play single strokes or use Auto Playback to lay down strokes until you click to stop.

Effective effects. Painter made its name translating natural media to a digital palette, and Version 2.0 adds even more goodies.

One of the most exciting features added to Painter 2.0 is Apply Lighting. This lets you do "2.5-D" rendering by placing one or more light sources of any color, intensity and direction in your image. This creates the effect of hanging your painting in a gallery (or smoky bar) and shining lights on it.

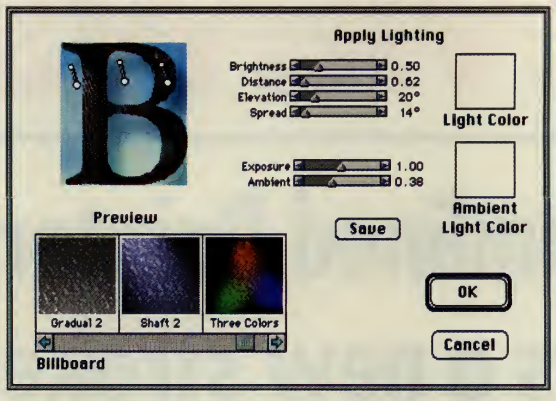
Many other new special effects also are offered: Glass Distortion faithfully reproduces the effect of viewing an image as if through a dark glass — or in many other possible lights. Marbling mimics Florentine marblers who create decorative papers by dragging a rake through layers of liquid ink. Fractal provides an abundance of controls to customize these effects.

You cannot preview a marbling effect, and Painter has no mechanism to abort an effect that might take much longer to produce than anticipated — not an uncommon occurrence. This inability to stop filter operations is true of other Painter processes and caused us to wait as much as 30 minutes for an effect we wanted only to try out. In addition, there is no indication of how long a process will take. Fractal is aware of this problem and plans to address it.

Luscious liquids. Painter has several new brushes (including two optimized for painting white on a black background). An Impressionist Brush has been added to the Artists palette, and four new brushes in the Eraser category darken an image by degree.

The nine new Liquid Brushes mimic oil-painting effects. They work best when used in combination with other effects, such as when cloning an image. All of these brushes smear more than they paint. Distorto moves paint around without adding color. Smeary Bristles smears the color you choose in the Color Palette (this Variant is paper-grain sensitive, meaning the texture of the paper grain will show through). Thick Oil oozes across the screen like a lazy snake. The effects you can create are striking, and as always with Painter, very realistic.

Four new watercolor brushes have been added to 2.0, as well as a new capability to make watercolors diffuse by varying degrees. One of the new brushes, Broad Water Brush, paints a wide stroke showing brush bristles. You can apply this new multiple-bristle effect to other brushes through controls added to the Brush Behavior palette.



Painter now offers a variety of special effects and filters. It also supports Photoshop plug-in filters. This Apply Lighting palette lets you cast lights onto your image to create dramatic or subtle effects.

Another one of Painter's filter effects, Glass Distortion, treats paper grain (or other textures) as bumps on a sheet of glass, which is laid over your image.

Cleaning up. Painter would greatly benefit from more levels of Undo (including at least one for working with Friskets). We also would like to be able to step through (and skip steps) when playing back a recorded session. The program also needs a way to quickly copy and paste an object.

Painter 2.0's documentation is generally thorough, although it is painfully short on tutorials. It is also short in some technical details, including the fact that virtual memory turns Painter 2.0 into a snail, even on a Quadra 900. Fractal plans to provide both tutorials and performance tips in a separate volume titled Painter 2.0 Companion, which will be shipped free to all users who return their registration cards.

For users who bought Painter before Nov. 1, 1992, the upgrade is $79; those who purchased it more recently receive it free.

Conclusions. Painter was truly an innovative product when it first shipped. Version 2.0 is easier to use and adds a complement of good image-editing and production tools, as well as a bucket of rich new features. It should satisfy the production demands of many professional artists. The new Liquid media hold faithfully to the standards that defined the first version. Text support, although needing a better interface, gets the job done.

While we still have some gripes, most notably the lack of Undo and no abort capabilities during long operations, Fractal has responded quickly and gracefully to the needs of production artists. Painter 2.0 is a product that verges on excellence; with a few tweaks, it can reach that top level.

Fractal Design Corp. is at 335 Spreckels Drive, Suite F, Aptos, Calif. 95003. Phone (408) 688-8800; fax (408) 688-8836. □

SYSTEM 7 COMPATIBILITY

Painter 2.0	
Balloon help	No
TrueType	Yes
Publish and subscribe	Yes
Apple events	Yes
32-bit addressing*	Yes

**According to vendor.*

Phaser 200

From previous page

for a hard disk. An EtherTalk option is available only for the 200i, for $695. If you need either EtherTalk or a printer hard disk, you need the 200i. The other feature unique to the 200i is color matching for SWOP (Specifications for Web Offset Publications) inks via a DIP switch on the rear panel. This works reasonably well, but it isn't a substitute for a color-management system.

We tested the Phaser 200i, but unless otherwise noted, our remarks apply equally well to the 200e.

Basics. Setup and configuration is easy. Clear documentation and a well-designed Installer make the Phaser 200i as close to plug-and-play as any color printer we've seen. The Installer installs a special version of the LaserWriter 7.1.1 driver that contains special paper sizes and color adjustment options for the printer. It also installs the TekColorPS control panel and Fkey. These allow you to preview the appearance of the printed page on your monitor but only in a limited way. TekColorPS works only when displaying 256 colors or less: It assumes your monitor has the gamma and phosphors of the 13-inch Apple color display and is designed to work with applications that don't attempt to make color adjustments. It's useful with presentation programs such as Aldus Persuasion or with Microsoft Excel's charting features but not with color-savvy applications such as Adobe Photoshop and Illustrator, Aldus FreeHand and PageMaker, or QuarkXPress.

On regular letter-size paper, the printer has an image area of 8.1 inches by 10 inches — the vertical dimension is limited because the print engine needs slightly more than a three-quarter-inch bottom margin for paper feeding. But Tektronix also supplies special paper and transparencies with a 1-inch perforated strip at one end. Using this size, the imageable area increases to 8.1 inches by 10.6 inches: Once you tear off the perforated strip, you're left with a letter-size page.

Applying the ColorCoat. The 200i ships with a pack of coated thermal-wax paper and a three-color thermal-wax ribbon. With these supplies, it behaves like a good-quality thermal-wax printer. But the plain-paper option will likely be its biggest selling point. To print on plain paper, you need the $195 plain-paper starter pack, which includes a plain-paper tray, 500 sheets of perforated plain paper and the ColorCoat thermal-wax ribbon.

ColorCoat works by first laying down a clear coat on the paper, to which the colored wax then bonds. The coating is laid down only on those spots on the paper that are designated to receive color, so the white areas retain the normal texture and color of the

MultiDisk breaks Bernoulli convention

By R. Bradley Andrews

Iomega Corp. has thrown the removable-cartridge drive market into a whirlwind with its latest family of offerings. The MultiDisk 150 group reads — and writes — a series of Bernoulli cartridges ranging from 35 Mbytes to 150 Mbytes; reads and writes the earlier 90-Mbyte Bernoulli disks; and can read, but not write, older 44-Mbyte cartridges.

Unlike most other drives where the read-write head is lowered to just above the disk media, Bernoulli drives use a vacuum created by the rapidly spinning disk to draw the media to just within range of the read-write head. Anything that normally would cause a head crash, such as a power outage or physical shock, releases the vacuum and causes the disk to fall safely away from the head.

The list prices on the MultiDisk 150 family are generally higher than those on the 88-Mbyte drives from SyQuest Technology Inc., Iomega's nemesis in the removable-drive market. Most of the SyQuest 88 drives list from $699 to $1,099, depending on the vendor.

Installation. The MultiDisk 150 comes in several varieties, all of which use the same range of cartridges. We tested the $1,225 Transportable version, which has two SCSI connectors and includes DOS and Mac driver software. In addition to the capability to connect to a Mac, the Transportable can be connected directly to an IBM PC or compatible equipped with a supported SCSI adapter. This allows this model to perform double duty in mixed shops.

Although Iomega recommends putting the drive at the end of the SCSI chain, it worked just fine in the middle. The back of the unit has switches to set the SCSI ID and for toggling internal termination.

Unlike most SCSI drives, it is important to have the incoming SCSI cable connected to the Input port and the outgoing cable connected to the Output port. When this order is reversed, the software driver will refuse to load. Switching the SCSI cables and restarting the machine will fix the problem, although we think that even many savvy users will miss this difference.

The $1,122 MacTransportable MultiDisk lacks the second SCSI port, so users are forced to put it at the end of the SCSI chain. A retractable carrying handle makes the Transportables "portable," although their 7.8-pound weight makes them a stretch for most arms.

An internal version of the MultiDisk 150, the MacInsider, and a Dual disk version also are available.

Software. Once the driver is copied to the System folder, it is loaded automatically at start-up, and newly inserted cartridges appear directly on the desktop and can be used like any other drive.

The Driver control panel works with no interaction, but it does provide a way to mount and eject partitions within a specific cartridge.

Iomega Workshop software, also included with the MultiDisk, provides all of the management functions required to keep cartridges working properly: It can adjust the size of the cache used by the unit and keep this cache on any mounted hard drive, set whether a cartridge should automatically mount on the desktop, and determine whether writes should be verified.

Iomega Workshop also can check both the drive unit and any cartridges for problems and fix any common ones it encounters, according to the company. The latest driver can be loaded quickly on any inserted disk to ensure it operates correctly, and an Erase Disk option is included in the program for convenience.

Cartridge-to-cartridge sector copies can be performed from within Workshop as well, even on a single unit. Although the Finder can do this, Workshop requires far fewer cartridge swaps.

The unit's documentation is short, but it covers all required information. A read-me file and a HyperCard stack also are included, but they basically have the same terse contents.

Performance. The MultiDisk is rated at 18 milliseconds, according to Iomega, and several tests with large files showed it very close to the speed of an average hard disk. While it may not be suitable for extremely high-throughput tasks, it is much faster than all but the fastest magneto-optical mechanisms and is quite suitable for most day-to-day tasks.

Performance is slightly faster than the 88-Mbyte SyQuest mechanism, and the Bernoulli tends to be quieter in operation than many of the SyQuest units we have used.

One minor problem we had with the Bernoulli is that disks fit very snugly into the slot and must be pushed in and pulled out by hand. This makes it important to have the unit on a stable surface and often requires the use of two hands. Mounted disks are locked into the case so they cannot be accidentally removed while in use.

The 90-Mbyte cartridges are a slightly different form factor than the new formats and, therefore, provide slightly reduced performance.

Cost comparisons. We surveyed a number of retail outlets that carried brand-name 88-Mbyte SyQuest drives and Bernoulli MultiDisk units. The SyQuest drives were, on average, $150 to $200 cheaper than the MultiDisk. This premium is much more modest than previous Bernoulli offerings, but many users will still look at SyQuest as a less costly solution.

MultiDisk cartridges come in four capacities: 35 Mbytes, 65 Mbytes, 105 Mbytes and 150 Mbytes. A single 150-Mbyte cartridge is priced at $245, a three-cartridge pack is $665, and a five-pack is $799. A single 65-Mbyte cartridge is $129, and the three-pack is $349. The 35-Mbyte cartridge is priced at $79 singly and $219 in the three-pack configuration.

While the list price of Bernoulli cartridges is high, when we surveyed a group of mail-order companies, Bernoulli 150 cartridges were slightly lower per megabyte than SyQuest 88s when purchased in groups of three or more.

Conclusions. SyQuest drives have become a standard of file transport second only to floppy disks, while Iomega has not been able to maintain the early success of the Bernoulli technology.

SyQuest has not been without its problems, however. Only recently has the company been able to ship 88-Mbyte mechanisms that can write to the older 44-Mbyte cartridges, a fact that has held up more widespread acceptance of the larger format. In addition, both SyQuest and Iomega have felt the pressure from 3.5-inch magneto-optical drives, which are pricier, but which have found increasing success in the marketplace.

The MultiDisk technology is Iomega's latest attempt to overcome that trend, and it might be the winner. Although the MultiDisk drives are still priced higher than SyQuest's 88-Mbyte units, the variety of the media types and backward read-write compatibility mean that it has more flexibility than SyQuest or the 3.5-inch magneto-optical drives.

For enterprises just entering the removable bazaar especially, the 150-Mbyte cartridge provides more storage than the largest SyQuest and most 3.5-inch optical disks. Full compatibility with older disks and a range of new intermediate-size media provide far more flexibility; and significant cost savings can be had by using the smaller cartridges when appropriate.

Iomega Corp. is at 1821 W. Iomega Way, Roy, Utah 84067. Phone (801) 778-1000 or (800) 777-6179; fax (801) 778-3450. □

score card

Transportable MultiDisk 150

Iomega Corp.
Overall value ◆◆◆ **List price: $1,225***

Part of the MultiDisk 150 family, the Transportable is a solid Bernoulli drive that handles cartridge sizes ranging from 35 Mbytes to 150 Mbytes. It is read- and write-compatible with the earlier 90-Mbyte disk format and can read the 44-Mbyte format. The Transportable also features compatibility with DOS-based systems (with appropriate SCSI adapter cards), although a nonstandard SCSI setup can cause some initial confusion if you aren't careful. A slightly better performer than the 88-Mbyte SyQuest-cartridge drives, the MultiDisk 150 also is pricier than SyQuest's offerings. For those willing to sacrifice compatibility with the ubiquitous SyQuest, however, it is a good and flexible choice.

Performance ◆◆◆ **Compatibility** ◆◆◆◆
Features ◆◆◆◆ **Documentation/support** ◆◆◆
Configuration ◆◆◆

**MacTransportable MultiDisk 150, $1,122; MacInsider (internal), $1,099; Dual MultiDisk 150, $2,499.*

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paper. Plain-paper color pages blend into a document much better than those printed on special thermal-wax stock: Thermal-wax paper tends to be a somewhat different color than plain paper, and its slick coating sometimes makes it fall out of unbound documents. ColorCoat solves these problems nicely.

We were pleasantly surprised to find that ColorCoat actually gave better results than using the regular three-color ribbon on coated paper. The ColorCoat colors were more vivid, and type appeared less jagged. In addition to the Tektronix-supplied plain paper, we tried Hammermill Laser Plus and Georgia Pacific Nekoosa Laser 1000, both of which gave excellent results, and St. Croix Laser Bond, which didn't work quite as well. Almost any smooth paper in the 20- to 28-pound range should work well — Tektronix will supply a list of recommended papers on request. We also found that ColorCoat prints were more durable and more resistant to scratching than those printed on thermal-wax paper.

The Phaser 200i is much faster than the other plain-paper color printers we've tested, such as Hewlett-Packard Co.'s PaintWriter XL300PS inkjet. Where the competition's engine speed is ranked in minutes per page, the Phaser 200 engine can print 2 pages per minute. This doesn't include imaging time, but the RISC-based Adobe PostScript Level 2 interpreter is quite speedy, and the fast engine combined with a low per-page cost — between 60 cents and 65 cents on plain paper — make it feasible to do 10 or so copies of a document without having to resort to a color copier. An optional $495 second paper tray makes the printer even more flexible. The trays are selectable through software, so you can load different media in each tray. For example, you can load transparencies in one and paper in the other or simply use the second tray to increase paper capacity.

Conclusions. In all, the Phaser 200 series printers are a well-thought-out solution for general-office color printing, combining speed, quality and the ability to handle a decent range of paper stocks. If you want to get into thermal-wax technology with a low entry cost, the 200e should be a good printer. If you want a little more flexibility and performance, the 200i is a very good choice.

For the graphic arts market, Tektronix's phase-change Phaser III solid-ink and Phaser IISD dye-sublimation printers probably hold more appeal, but the promise of better color management via EfiColor and KCMS could extend the Phaser 200 family's usefulness into that market, too.

Tektronix Inc. is at 26600 S.W. Parkway, Beaverton, Ore. 97070. Phone (503) 682-7377 or (800) 835-6100; fax (503) 685-3063. □

DATDisk puts 1 GB on desktop

By R. Bradley Andrews

JVC Information Products Co. of America recently entered the small circle of vendors offering desktop-mountable digital audio tape drives for the Mac. The $3,300 DATDisk implements the International Standards Organization's Data DAT format to provide nearly 1 Gbyte of random-access storage on the Mac desktop using a 60-meter cartridge.

MicroNet Technology Inc. of Irvine, Calif., offers the same drive, under the name DATDisk-1000, at $3,395. We tested JVC's version.

Although it remains most useful in the backup arena, it is fast enough to make it a viable alternative for what JVC terms "near-line" storage. The DATDisk also is the first desktop-based DAT unit for the Mac to allow data to be written to space recovered on the tape when files are deleted.

Basics. The DATDisk measures a compact 6 inches by 10 inches and is 3.5 inches high. (An internal version is available for the Mac Quadra series — JVC also is working on internal models for the Mac IIvx and the Centris line.) The drive package includes a version of Dantz Development Corp.'s Retrospect backup software (see story, below right), as well as a single DAT cartridge, a Mac-to-SCSI cable and a cleaning cartridge.

The DATDisk requires System 6.0.4 or later on a Mac with a minimum of 2 Mbytes of RAM and at least 3 Mbytes to 5 Mbytes of hard disk space, which is used for caching information. It uses 60-meter DAT cartridges — it does not support the longer 90-meter tapes.

Almost 900 Mbytes of formatted disk space is available when a tape is used in Desktop mode, and closer to 980 Mbytes is available if the DATDisk is used in the streaming Tape mode.

DATDisk uses a DIP switch to set the SCSI address. Electrical tape covered part of the switch on our unit, a tacky addition to an otherwise nice-looking case.

Software. Once you install the hardware, you must copy the DATDisk control panel into the System folder and restart the machine. The unit then operates like any other removable drive, mounting formatted tapes directly onto the desktop and producing the standard formatting dialog box when uninitialized tapes are inserted into the unit.

A cache file must be stored on a local hard disk as well. The size of this cache varies depending on the number of DATDisk units attached. The suggested setting is 4 Mbytes per attached unit, with an additional 1 Mbyte for overhead, although you can adjust this downward slightly, with the penalty of decreased performance. A larger cache will speed operations.

From the control panel, a Tapes button brings up a dialog box that contains detailed information about each tape that has been mounted by the unit. You can delete tapes from this list — doing so will clear out any buffered information that tape had in the cache file, possibly leaving that tape in an unreadable format. The software warns you of this problem.

A Resolve function cleans up the directory data for a tape. This feature should be used only as needed since it can take from five to 60 minutes to complete the procedure, during which time you cannot use your Mac. You also can set the error sound in the control panel to signal you if a problem occurs while loading a tape.

Two other programs are provided to test the unit and fix problems. The Checkdat program tests the system and should be run after the unit is initially connected or any time problems are encountered. If a problem is found, a message is displayed that you need to relay to JVC's technical support. A blank tape is required during this process, since Checkdat will erase all the data on it.

The other program, the DATA/DAT Rebuild program, regenerates portions of a tape that have been damaged or not properly updated because of a system or power failure. The larger the cache you use, the greater the possibility of problems, although the system often can recover from the interruption without resorting to the rebuild program.

Overall, the software could use some work. Although fully functional, the components are a bit below the standard of most Mac software. There is no support for balloon help, and both Checkdat and DAT/DATA Rebuild use a simple terminal window to display information during their operation.

Performance. The speed of the tape depends on both how the data is being accessed and how it is laid out. During tests, a large Aldus PageMaker file took anywhere from 30 seconds to one minute to load, depending on the fragmentation level of the tape. Copying a 14.6-Mbyte file to and from the tape took 150 and 186 seconds, respectively, compared with 118 seconds to copy it between two attached hard drives.

When working with files that had been stored sequentially, access was fairly quick, giving credence to JVC's surprising claim that the DATDisk can support QuickTime video. Playing video also requires a larger cache of about 10 Mbytes per unit in addition to the optimal physical layout of the file, but we don't really expect users to play movies with the DATDisk.

Random-access tests showed that the unit is unacceptably slow for disk-intensive activities in any other case. Loading memory-resident programs worked fine, although such programs would be much better installed on a fixed hard drive.

DATDisk's overwrite capability allows it to reclaim the space normally lost on other desktop-based DAT drives. With other units, data could be written sequentially only after all data currently on the tape, allowing space to be needlessly lost. The DATDisk overcomes this, although with a significant speed penalty. Overwrites occur at about one-third the speed of normal appends.

None of the included utilities has the ability to defragment a tape, which is a major omission. This feature is scheduled to be added to the next version of the software, according to JVC.

Some glitches. Although using the DATDisk is mostly seamless, several areas do leave room for improvement. At times while the unit is working, the Mac will appear to be stuck, with only a watch cursor showing. Sometimes the DATDisk's light will provide an indication of ongoing action, but often things just seem to hang. These delays occur because of the time required to flush any cache data to or from the tape, but much confusion could be avoided by simply animating the cursor.

Also, the DATDisk's Eject button is enabled during normal operation. This can cause a tape to be prematurely ejected, potentially causing a great deal of trouble. Locking the button while the unit is active would solve this problem.

Measuring up. The DATDisk's media costs stand out favorably against its main competitors: SyQuest and Bernoulli cartridges and optical media. SyQuest, Bernoulli and the newer floptical units are much less expensive up front and provide better access times than the DATDisk, although at a cost of $1 to $2 per megabyte of storage.

High-capacity optical units are priced similar to the DATDisk; their media cost about 15 cents to 40 cents per megabyte, and they generally feature comparable or better access times. Prices on optical units are dropping, which will hurt the DATDisk.

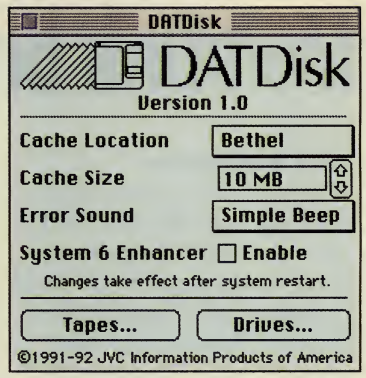
The DATDisk's major advantage is its very low media cost — less than two cents per megabyte. This means that multiple gigabytes of data can be stored much more inexpensively than with any of its competitors, even when factoring in the higher entry cost.

Although this low media cost is good, it is important to note that most DAT drives without desktop-mounting capabilities are much less expensive than the DATDisk. In addition, most of these units come with Retrospect as well.

Conclusions. The DATDisk is a decent unit, although it could use a bit of work on both its hardware and software interface. It can retrieve data fairly quickly when everything is sequential, but it slows down significantly when it must seek around the tape to locate different parts of data. Its relatively high entry price will make it a barrier to the more budget conscious, but its use of low-cost DAT tapes makes it a good choice for backups and tasks that require multiple gigabytes of storage of large files.

On the whole, we feel that the DATDisk is a satisfactory performer, but it won't supplant the other removable technologies in the market today. It should find a place among those users who want the ease of desktop mounting with the low cost of tape storage, but the price will have to drop closer to the level of current DAT drives for the unit to gain a wider audience.

JVC Information Products Co. of America is at 19900 Beach Blvd., Suite I, Huntington Beach, Calif. 92648. Phone (714) 965-2610; fax (714) 968-9071. □



The DATDisk control panel sets the cache size and location, and its Tapes and Drives buttons provide added information.

score card

DATDisk

JVC Information Products Co. of America
List price: $3,300
Overall value ◆◆◆

DATDisk turns a 60-meter digital audio tape into a random-access volume that can be mounted on the desktop. It uses a large hard disk-based cache to keep performance from getting sluggish and, unlike other DAT drives that mount tape on the desktop, the DATDisk can reuse the space freed by deleted files. The DATDisk's best role is for people who want direct access to many gigabytes of files without having to go through a tape-backup program — although the DATDisk does support (and ships with) Dantz Development Corp.'s Retrospect. If the DATDisk software's interface improves and the price comes down some, it will become an even better competitor with conventional DAT drives.

Performance ◆◆◆
Features ◆◆◆
Compatibility ◆◆◆◆
Configuration ◆◆◆
Documentation/support ◆◆◆

Using DATDisk with Retrospect

The DATDisk provides two methods of support for Dantz Development Corp.'s Retrospect backup and archival software, which currently ships with the DATDisk. It can be used in the DATDisk's Desktop mode as a normal volume to store a backup file, or it can be used in streaming Tape mode to operate as a normal tape device. Tapes are not transportable between the two formats, and a brief manual is provided that explains what must be done to use Retrospect with the DATDisk.

Switching the unit to Tape mode requires that you disable the DATDisk control panel and restart the system. The package includes an extension manager to aid this process.

Surprisingly, Retrospect backups actually went faster when backing up in Desktop mode than when in Tape mode. With Retrospect's compression settings off, it took 16.5 minutes to back up about 94 Mbytes in Desktop mode and 19 minutes in Tape mode. Performing the same backup with compression on slowed things to 45 minutes in Desktop mode and 48 minutes in Tape mode on a Mac IIx.
— By R. Bradley Andrews

When we introduced cc:Mail™ for Macintosh® Version 2.0, we knew we had a winner. And it's nice to see that MacWEEK® agreed so enthusiastically.

The undisputed leader in enterprise-wide connectivity.

cc:Mail can send and receive text, files, graphics and faxes across all major platforms without the need for gateways or special configurations. When comparing it to the competition, MacWEEK said that "cc:Mail 2.0 is the winner if compatibility across platforms and ease of set-up are your chief criteria."

Features your Mac users will love.

Unlike Quickmail or Microsoft® Mail, cc:Mail displays file attachments as icons. Just double-click to launch the file. Or drag-and-drop to move or copy the file. And unlike the competition, cc:Mail lets you format your messages with a text ruler and highlight them with color.

Here's what else the editors of MacWEEK said:

About cc:Mail:

"Setting up and maintaining a cross-platform system with this package is a dream, and the feature set of the client is top-notch."

"Actions that a mail user performs frequently–creating a new message and reading the latest message–are always a click away."

About the competition:

"Microsoft Mail and WordPerfect® Mail both suffer from inordinately complex cross-platform setup processes; understanding these systems is a major commitment."

"QuickMail was the only package whose mail server crashed during testing...(its) spotty reliability for Macs and PCs was the primary impetus for the upgrade... so this evidence of continued problems concerns us."

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Lotus **cc:Mail for Macintosh**

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Turning complex databases into polished documents

Several utilities for desktop publishing programs aid in producing catalogs and other data-intensive publications.

By Charles Rubin

When publishing from a large database is part of your business, Mac users must cross a gulf between the raw data and a professional-quality layout. Any database program can whip out a basic columnar report, and some products such as Claris Corp.'s FileMaker Pro and ACI US Inc.'s 4th Dimension tout even more graphics flexibility.

But when it comes to color separations, kerning or tracking control, no database gives layout designers what they need. To make the transition, some companies have turned to word processing programs as a simple way to gain formatting flexibility, while others use specialized data-import filters to pull data into page-layout programs.

The data's the thing. The choice of data-formatting solutions often depends on the relative importance of form and content. At The Carson Group in New York, the company's corporate clients pay for regular reports on how much of their stock is held by institutional investors and how those holdings change over time.

The Carson Group solicits stock-purchase information from institutional investors and captures it in a 4D database that has grown to about 500 Mbytes in the past two years.

Rather than outputting reports directly from 4th Dimension, the company outputs data in RTF format and then completes the reports using style sheets in Microsoft Word. Finished reports, which can run 100 to 200 pages each, are sent to clients both on paper and on disk as Word files.

"By outputting the data in a Word file, we give it to our clients in a format they can easily work with," said John Papa, partner at The Carson Group. "If they want to add some text or some comments before passing the report to higher management, or take the report home on a PowerBook, it's easy for them to do. They don't have to learn 4th Dimension.

"Sometimes, figures change right as a report is on its way out the door, and it's much faster to change a Word file and reprint a page or two than it would be to run a whole new report from the database."

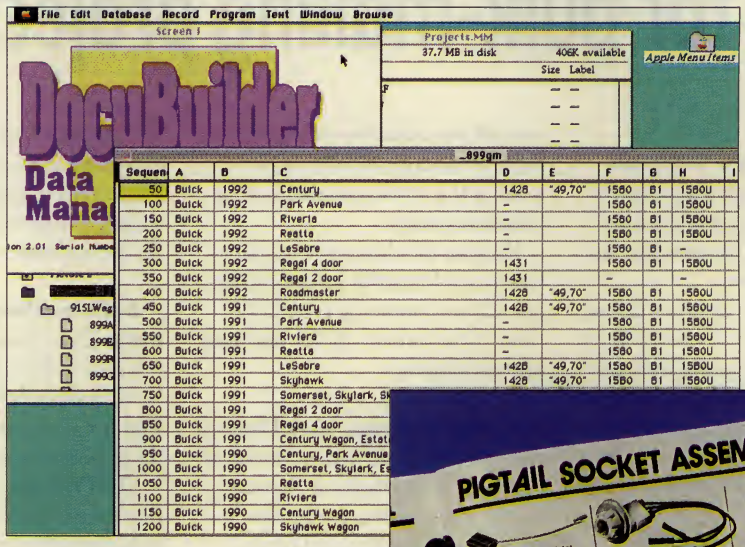
Although Word style sheets don't offer the typographical control of a desktop publishing program, Papa said his clients are happy. "Our clients pay for our research, so the level of presentation is much less important to them than the data being presented."

More format control. When a publication's complex format requires a page-layout program, third-party data-import filters bridge the gap between raw data and the finished design.

Xdata 2.0, an XTension for QuarkXPress from XChange Inc., and DataShaper 1.2 from Digital Composition Systems International (formerly from ElseWare Corp.), an import filter for Aldus PageMaker, allow designers to create a layout with place holders that identify data fields. Place holders are formatted like any other text in the layout, and once the layout is complete, an import command flows data from a comma- or tab-separated text file into the layout automatically.

But import filters do more than simply place data: They evaluate it. Along with field names, users can insert HyperTalk-like commands in a layout to examine the data as it's being imported.

Commands and conditional statements can apply different formats, pull data from different fields or even place data in different locations based on the contents of each incoming record.



McMunn Associates used Xdata 2.0 to convert this Excel database into a parts catalog for General Automotive Specialty.

By providing a vital link between raw data and page-layout programs, import filters can cut formatting time by 80 percent or 90 percent.

McMunn Associates, a design and production company in Collingswood, N.J., has built a business using QuarkXPress and Xdata 2.0 to publish catalogs, price lists and shareholder reports from spreadsheet or database files supplied by its customers.

Recent major projects include a 600-page botanical atlas for the University of Pennsylvania and a 120-page auto-parts catalog that contains 900 scanned photos.

"Xdata is the tool that sets us apart from other companies that do this kind of work," said Marty Farlow, McMunn vice president of product development. "It saves a lot of labor, and it gives us much faster turnaround times."

In a typical 20-page shareholder report, for example, Farlow's designers can set up a layout with Xdata, import the data and complete the job in 15 minutes, while doing the formatting by hand might take two and a half hours.

Working in an XPress layout, designers insert data field place holders and control logic to create a prototype (in Xdata terminology). In the botanical catalog, for example, the prototype for each plant listing contained a picture field with a conditional statement attached.

As each record was imported, the picture field's instructions retrieved a particular photo file from the disk and then, depending on an importance code in another field, sized and placed the photo in a particular location in each record. With 3,400 plant listings, sizing and placing photos by hand would have taken several weeks, but designing the prototype took three days.

Even though the filter applies conditional tests to incoming data, the import process is quite fast. On a test run using a Mac IIci with a cache card, Xdata took 12 minutes to import 60 pages of the botanical catalog, each containing six photos.

Beating a time crunch. In the hectic production environment of a monthly magazine, import filters help designers meet tight production schedules when formatting multipage tables or directories.

At the National Association of Desktop Publishers, a nonprofit trade association in Topsfield, Mass., designers used DataShaper to produce the second edition of the group's annual directory and have since incorporated it into production of the group's monthly journal.

After typing hundreds of listings into a PageMaker layout for the group's first directory, the need for a database was obvious, but the group didn't want to give up formatting control. "We switched to FileMaker Pro for data storage," said Susan Sigel, NADTP vice president, "and we got DataShaper to flow the data into PageMaker layouts."

More recently, Sigel's staff has used DataShaper to beat a time crunch in producing a resource guide inside the December issue of the NADTP Journal. The group used FileMaker Pro to store 500 vendor listings for a resources directory but needed to have a layout in PageMaker to produce four-color separations. After saving the data in a tab-delimited text format,

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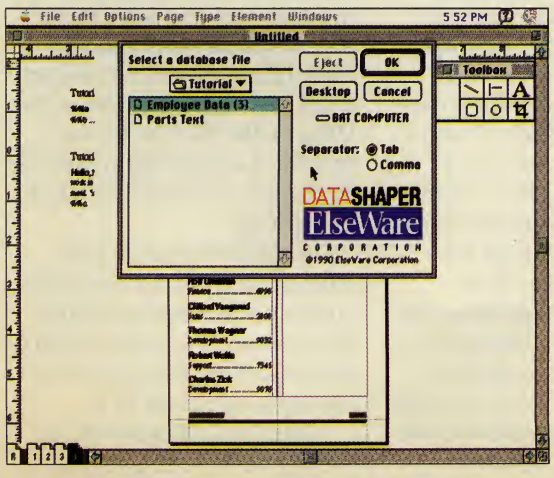

DataShaper 1.2 can import and automatically format database files that were saved in text or tabular formats.

Mac software: Stamp of approval given for bulk-mailing projects

CHAD KUBO

By Larry Stevens

Macs now compete with mainframes and midrange machines for maintaining, sorting and printing bulk-mailing jobs that contain tens of thousands of pieces.

To handle these massive mailing responsibilities, Mac users can turn to three different types of software: generic database-management systems, bulk-mailing programs and CD-ROM databases.

- Generic database-management systems, such as ACI US Inc.'s 4th Dimension, Helix Technologies Inc.'s Helix Express and Claris Corp.'s FileMaker Pro, are traditional list keepers.

With these programs users can generate an infinite variety of custom reports and sort and extract records using any number of parameters. Database managers also can be programmed to print addresses as well as bar codes on labels and envelopes.

- Bulk-mailing programs, such as MacEnvelope Professional from Synex Inc. and Bulk Mailer Plus from Satori Software Inc., are specialized database applications that can automatically sort envelopes and print the needed bar codes and endorsements to make the list eligible for the maximum discount. These programs also can store large lists, extract records by category and print reports.
- CD-ROM databases allow Mac users to clean up their mailings lists. ZP4 by Semaphore Corp. and the soon-to-be-released Bulk Mailer C.A.S.S. from Satori Software add ZIP+4 carrier routes to records and standardize spelling of addresses.

Carrier route (ZIP+4) information allows mailers to qualify for more advantageous pricing, while making the process of eliminating duplicates easier.

Because the three types of databases used for mailings have different features, some users need all three, while others opt for only one or two of them.

Using all three. Mark Danford runs a health-food mail-order business called Performance Products Inc. in Atlanta. Because he does a wide range of mail-based promotional activities, he uses FileMaker Pro, MacEnvelope Professional and ZP4.

"FileMaker Pro is easy to program," Danford said. "For specific types of mailings, such as personalized letters, that's something I couldn't do with MacEnvelope. But when I have to get out tens of thousands of pieces, I don't want to have to figure out the best way to sort the letters."

For example, Danford uses FileMaker Pro's mail merge capabilities to send out 800-piece customized mailings to preferred customers. But when he does large mailings that have to be bar coded and sorted by carrier route, he imports his FileMaker list into MacEnvelope Professional, which then sorts the list to conform to postal regulations.

Danford has been using ZP4 not so much for Coding Accuracy Support System (C.A.S.S.) certification, which hasn't been an issue until now (see story, below), but to find and eliminate duplicates in the mailing list, which he said is the biggest problem with most direct-mail houses. "[Duplicate names are] very hard to find, and they're very expensive to keep," Danford said. "The most important first step in solving the problem is to standardize the addresses."

Bulk-mailing software only. Dana Yanulavich, marketing director at SUNY Press of Albany, N.Y., relies solely on Bulk Mailer Plus for all the mailings her department generates internally.

SUNY Press, a department of the State University of New York, publishes primarily scholarly works and does about 200 promotional mailings a year ranging from 200 to 80,000 pieces each.

The names on the mailing lists come from many sources — everything from cards dropped in inquiry boxes posted at conferences, floppies from authors or even from organizational rosters. But because the names are used only to generate mailings, there is no need to maintain them in a database manager.

Additionally, because Yanulavich rents prepared lists from mail houses for large mailings, there is no need to use a C.A.S.S. product. "Our job is to go from lists of names to labels that contain the names on the list," Yanulavich said. "Bulk Mailer does everything we need to get that job done."

Database manager and C.A.S.S. database combo. Companies that need extensive reporting capabilities typically maintain their lists on database-manager software. By programming the database to also print the labels or envelopes, the need for importing and exporting to and from a mailing program can be eliminated.

Robert Cline, owner of Computech in Branson, Miss., does bulk-mailing projects for corporate clients. The majority of the mailings range from 10,000 to 1 million pieces.

Computech's menu of services includes data entry, maintaining lists, sorting and mailing envelopes, and reporting. Because he wanted to be able to offer his clients any reports they needed, Cline programmed Microsoft Corp.'s FoxBASE+ for the Mac to handle the list management as well as the mailing functions.

Cline generally gets mailing lists created on his clients' IBM AS/400 midrange machines. He exports the lists to ZP4 to be cleaned up, brings them back into Microsoft's FoxBASE and then provides whatever services his client requested. "With the way we're set up, there is almost nothing we can't do in terms of list management," Cline said. "That's the advantage of using a programmable database manager."

Database manager only. Of course, not all Mac owners are able to do their own database programming as Cline did. As a result, there is a mini-industry of companies that customize database managers to provide specific mailing services.

> "Now that the post office says we have to run our list through a C.A.S.S. product, we decided to use the Mac for the job."
>
> — Jim Lane

One such company is Sapphire Systems Inc., whose product, InHouse Subscription Manager, was developed with 4th Dimension to automate magazine and newspaper circulation functions.

Cindy Weinstein, graphics coordinator at Medical Video Productions of St. Louis, uses InHouse Subscription Manager to control mailings but also to provide a range of other services that helps her company's marketing efforts.

Medical Video Productions sells "video journals" on a subscription basis to the medical community. Each of the five different bimonthly journals is a videotape showing one or more surgical procedures.

Weinstein uses InHouse Subscription Manager not only for mailings but also to provide reports that detail such things as the number of renewals received categorized by medical specialty and the balance of unpaid subscriptions. The system also is used to look up payment data when a subscriber calls in with a question.

"We have a very close relationship with our subscriber base," Weinstein said. "When someone calls us, we want to be able to serve him or her quickly. To do that we needed a program that was created specifically for our kind of work."

C.A.S.S. databases. Finally, some companies use Mac mailing software only for list-cleaning functions.

Jim Lane, vice president at Jones-Onslow EMC Inc., a Jacksonville, N.C., utility company, is responsible for overseeing the mailing of 50,000 electric bills a month. His company's mailing list is maintained on proprietary software created on DEC VAXes.

"Now that the post office says we have to run our list through a C.A.S.S. product, we decided to use the Mac for the job rather than go through the expense of programming the DEC machines to do it," he said.

Jones-Onslow EMC has a number of Macs on the desks of executives and managers. Since the hardware was already in place, and a Digital Equipment Corp. product called Pathworks, which allows for DEC-to-Mac file transfer, was available, Lane decided to enlist the Macintosh and ZP4 for the job of list cleaning.

He added that because most office workers and managers at the utility were comfortable with the Mac interface, the company didn't have to go through the process of training people to use ZP4.

"Getting anything new up and running on the VAX takes time," Lane said, "but the Mac is much easier." □

Keeping up with new postal regulations

Beginning this month, the U.S. Postal Service will require that to garner the mail rates, mailing lists must be cleaned by a program that is approved as a Coding Accuracy Support System.

Semaphore Corp.'s ZP4 is currently approved and Satori Software Inc. expects to have its Bulk Mailer product approved shortly. Because the Postal Service makes a large number of ZIP+4 changes each month, C.A.S.S.-approved programs have to be updated quarterly. So regular bulk-mail software users will have to buy four editions of the database yearly.

One alternative to buying a C.A.S.S. program is offered by the Postal Service's National Address Information Center in Memphis, Tenn. NAIC will clean up a list for free; however, the list has to be submitted in DOS-formatted disks with fields of fixed-length records. Mac To Memphis And Back from Synex Inc. translates a Mac mailing list into the correct DOS format, and when the disk containing the cleaned list arrives back from NAIC, the software converts the records back into Macintosh format.

— By Larry Stevens

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Publishing

From Page 53

it flowed the file into PageMaker layouts.

"Normally, it would have taken us eight or nine days to do a layout like that, but with DataShaper it took about two days," Sigel said. Different vendor descriptions had different lengths, and the layout included icons for phone and fax numbers. The NADTP designer used DataShaper place holders and commands to control placement and formatting of descriptions, category headings, vendor names and other information.

Once the layout was perfected, importing the data proved fast enough for 11th-hour changes. "Some of our vendor information changed at the last minute," Sigel said, "and it was actually faster to change the data in the FileMaker Pro file and then reflow the whole file into the layout than it would have been to edit and reformat the data in PageMaker."

Data merging for designers. Talk of HyperTalk-like control languages may strike terror into designers' hearts, but it's not all that bad. Sigel said it took her designer about four hours to get up to speed with DataShaper. Even the more complex layouts produced by McMunn Associates didn't require a database guru. "We've had people come in here who knew QuarkXPress and got up to speed on Xdata within two weeks," Farlow said, "but it helps if you have a logical mind." □

Product Info

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Fax (408) 252-7765

CLARIS CORP.
FileMaker Pro: $399
5201 Patrick Henry Drive, Box 58168, Santa Clara, Calif. 95052
Phone (408) 727-8227

DIGITAL COMPOSITION SYSTEMS INTERNATIONAL
DataShaper 1.2: $249
3101 W. Peoria Ave., Suite B 310, Phoenix, Ariz. 85029
Phone (602) 942-6553 or (800) 551-6788
Fax (602) 942-6615

XCHANGE INC.
Xdata 2.0: $299
P.O. Box 270578, Ft. Collins, Colo. 80527
Phone (303) 229-0656 or (800) 788-7557
Fax (303) 229-9773

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DIGITAL EQUIPMENT CORP.
Pathworks for Macintosh: $308 per Mac
146 Main St., Maynard, Mass. 01754-2571
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Fax (508) 493-8780

HELIX TECHNOLOGIES INC.
Helix Express: $439
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Phone (708) 205-1669
Fax (708) 281-7091

MICROSOFT CORP.
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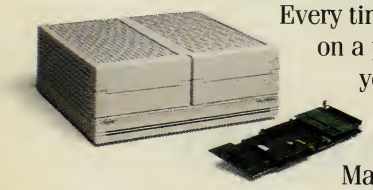

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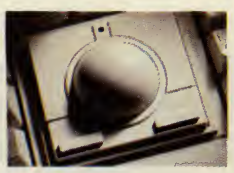

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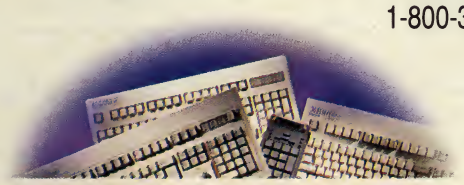

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GORDON STUDER

MacInTouch RIC FORD

Two-way talking vital for Macintosh owners

Before moving on from the HFS bug to other topics, we look at more details of its history as well as issues of communication between Apple and the outside world.

ISSUES & TRENDS

Stepping back. There's Apple and then there's Apple.

About one year ago, developers at Central Point Software Inc. and Symantec Corp. independently began discussing the file system bug, recently described here, with their contacts in Apple's system-software groups. Apparently, no one filed a formal bug report with Developer Technical Support, which is Apple's official channel for technical information and bug reports.

When developers at La Cie Ltd. encountered the bug, they contacted DTS, too, but they were unable to analyze it completely, and it again failed to be recorded in Apple's tracking system. FWB Inc. also encountered the bug but did not resolve it. No one made a connection to the earlier reports from Symantec and Central Point.

La Cie found a work-around for its formatter, and no flood of calls to technical-support lines arose to signal the problem.

More recently, as the bug started affecting Duo users, another programmer reported the problem to another engineer at Apple, once again bypassing DTS. The engineer searched Apple's bug databases, found nothing and handed off the bug to someone else within Apple for a new analysis, unaware of the previous work on the problem.

This time, Apple engineers said they have entered the bug into an internal database and are actively working to develop a solution to it.

Apple, the company, finally knows about a problem previously known only to a few Apple employees.

(As this was being written, Apple would offer neither a timetable for a solution nor an indication of the technical direction it is taking.)

No way out. There's an important thing to remember about bug tracking at Apple: It's one-way only.

We can send in bug reports, but we have no way to search among the reports sent by other people.

We wrestle with the same bugs other people are experiencing, duplicating the same time-consuming debugging processes performed elsewhere.

Because a lot of information comes in to Apple but little goes back out to customers, we turn to user groups, on-line networks, third-party developers and consultants for help. These outside organizations handle the lion's share of Macintosh support for Apple, but they are navigating in the dark without Apple information on system-software bugs.

In one acute example, developers of data-recovery utilities had to sign nondisclosure agreements with Apple to get information about the bug regarding missing files and folders, which was addressed by System 7 Tune-Up.

Clearly, the company is not doing all that it could to disseminate technical information ("Inside Macintosh" and Macintosh Technical Notes, notwithstanding).

Although it may be embarrassing to admit bugs, it is in Apple's long-term interest to open up more to the public. The Mac is not even close to being a simple appliance, and we need all the technical information Apple has to offer to use this machine productively in the face of its ever-growing complexity.

BUGS & TIPS

Catalog catch. As mentioned in the Feb. 15 column, the hierarchical file system bug can be triggered by large catalogs as well as certain extent-file sizes.

Dave Camp, the developer who created Disk Bug Checker at Central Point, recently saw a real-world example of the problem. A server disk containing more than 30,000 files crashed, and the HFS bug prevented it from mounting on the desktop.

Camp subsequently revised his application to add a test for problematic catalogs, and Disk Bug Checker 1.1 now is available from the usual freeware sources, including ZiffNet/Mac (file DISBUG.SEA at location ZMC:DOWNTECH).

There is no solution for the catalog problem except to break up the disk into smaller volumes with fewer files on each one.

Relining. When I tested various formatters' effects on the HFS bug for last week's column, the applications were not at the most recent update levels.

In particular, I used Silverlining 5.31, which is susceptible to the HFS bug at volume sizes near 90 Mbytes. Releases starting at Version 5.4 lock out a certain setting to avoid the bug.

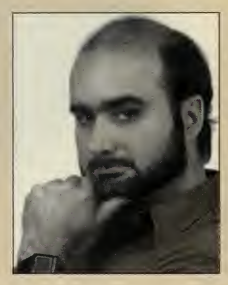
Off limits. HFS has proven to be remarkably robust, despite its lowly origins as an extension of the original 400-Kbyte floppy file system. Modern demands, however, are pushing the file system's limits in several areas. Sometimes, the file system runs out of steam; sometimes it is the Finder or the Standard File package, which selects and names files, that stalls.

You should avoid putting tens of thousands of files in one volume or hundreds of files in a single folder, or nesting folders scores of levels deep. In System 6, the Desktop file is a serious bottleneck with large numbers of files containing resources. □

Comments on MacInTouch are welcome at 7 Parmenter Ave., Maynard, Mass. 01754. Phone (508) 897-2621. Address electronic mail to RICFORD on AppleLink or MCI Mail; to 72511,44 on CompuServe; or on the Internet to 72511.44@compuserve.com. Join us on-line in the MacWEEK Forum at location ZMC:MACWEEK on CompuServe or ZiffNet/Mac.

Ask David Ramsey

Memory performance issues



Along with the 72-pin SIMMs in the newer Macs (see last week's column), Apple has implemented a memory-interleaving architecture on its new Centris 650 and Quadra 800 computers. A common technique in the IBM PC and compatible world, memory interleaving splits memory access across multiple SIMMs to achieve higher performance.

How it works. The performance of reads or writes to memory depends directly on the access time of the RAM. The CPU must specify a memory address, wait for the RAM chips to get ready, then read or write the data. The length of this pause defines the access time.

The RAM used in a Quadra 800 has an access time of 60 nanoseconds. That's not very long — light travels only 59 feet in this sliver of time — but the 800 performs millions of accesses per second, so it adds up.

Interleaving reduces the access-time penalty. Centris 650s and Quadra 800s interleave memory automatically for accesses to RAM on their motherboards; interleaving also takes effect when you have two SIMMs of the same size in adjacent slots. In this case, all odd memory addresses are stored on one SIMM and all even addresses on the other. Sequential reads or writes are split across the two SIMMs, and the interleaved access effectively eliminates the access-time wait. While one chunk of data is being read from one bank, the next bank is getting ready, so it serves up data almost instantly.

While the effect of interleaving on normal operations varies, you can expect performance improvements of up to 20 percent.

Q. Which Macs can use SCSI-2 drives?

A. Any of them, but none to full advantage. Currently no Mac completely implements the SCSI-2 standard. It comes in three parts: the Common Command Set (CCS), SCSI-2 Fast and SCSI-2 Wide. While some newer Macs use NCR Corp.'s 53C96 SCSI controller, which supports CCS, no Mac yet supports SCSI-2 Fast or Wide directly. Some SCSI-2 Fast drives will work — although not at their full speed — but SCSI-2 Wide drives require 68-pin connector cables that no Macs have.

Please send questions to David Ramsey on CompuServe: 76702,335 or to Ask David Ramsey, c/o MacWEEK, 301 Howard St., 15th Floor, San Francisco, Calif. 94105.

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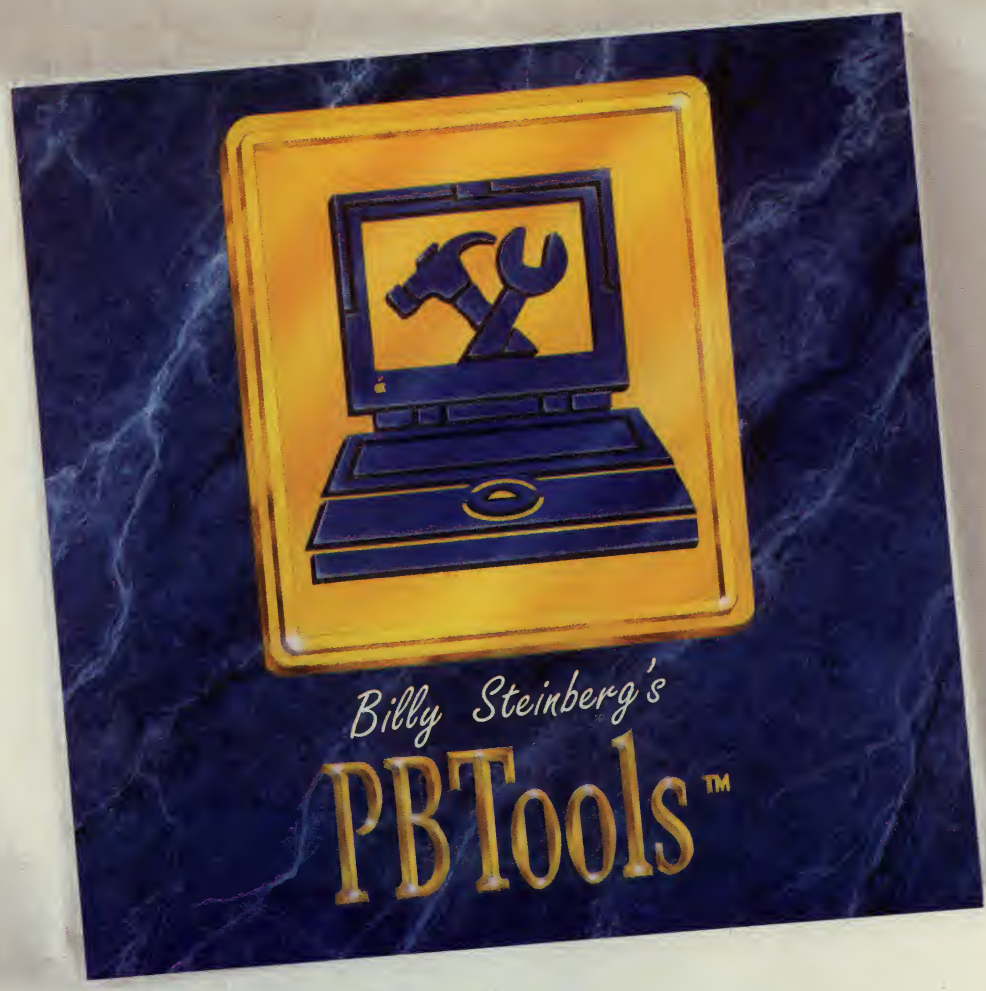

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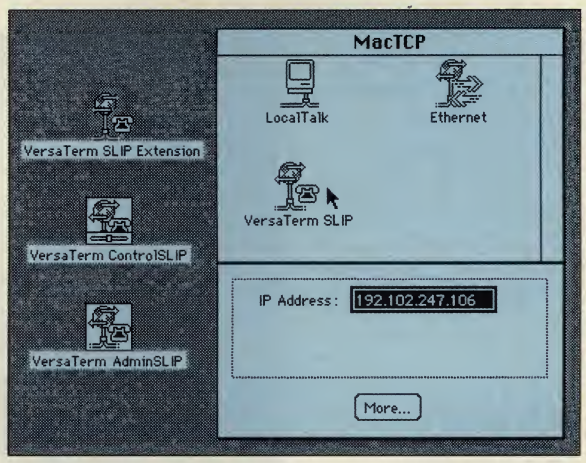

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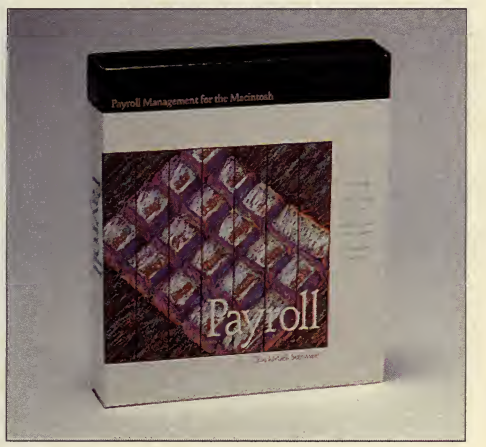

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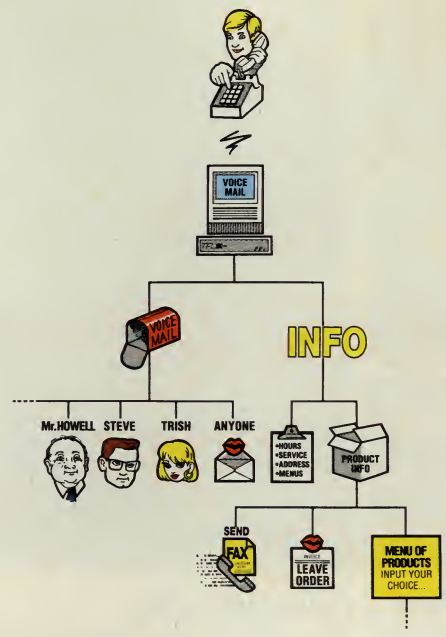

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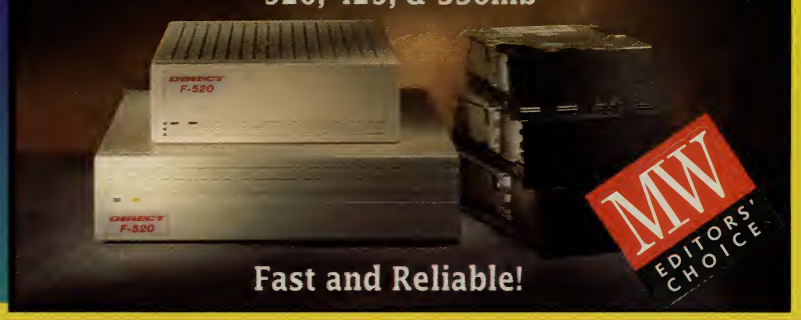

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Sampo 19"

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- The SAMPO is a high quality dual page display without the high cost!
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- 2 page display supports all Mac IIs', the SI, SE-30, SE and the LC

Trinitron 20" Color System

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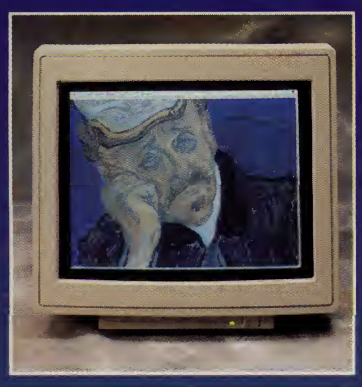

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You want to upgrade your removable drive to 88 megs, but you've got a shelf full of old 44s staring you in the face. You have two options. One, use the old cartridges as coasters at geek cocktail parties. Or two, buy the new Spin Syquest 5110C drive that reads and writes both 44 and 88 meg cartridges. True, this drive does not format 44 MB cartridges, but we have a way around that – pre-formatted 44s.

Syquest 5110C 44/88 Drive	$599
Syquest 88 MB Removable	$499
Syquest 44 MB Removable	$399
Syquest Media	
Unformatted 44 MB	$61
Unformatted 88 MB	$99
Formatted 44 MB	$85
Formatted 88 MB	$139

ZERO FOOTPRINT DRIVES

We've gotten letters lately – mostly in crayon – from a few folks asking why we call these drives "zero footprint" when they obviously exist in three dimensions and take up space. We'd like to point out that when placed under your Plus or Classic or SE it takes up no more space than the computer already does. Zero. Neat trick, huh? Our sturdy zero-footprint drives feature a number of different mechanisms from makers like Conner, Quantum, Toshiba. Check the matrix below for the capacity you need. And please, put down that crayon.

pacity (MB)	Model Number	Average Access Time (msec)	Transfer rate (K/sec)	MTBF (Hours)	MFG warranty (months)	Internal Drive Price	External Drive Price	Cyclone Drive Price
onnor								
5	CP-30080E	16	1300	150000	24	$219	$289	
20	CP-30100	16	1300	150000	24	$279	$349	
70	CP-30170E	16	1400	150000	24	$319	$379	
13	CP-30200	15	2000	150000	24	$419	$479	
uantum								
2	ELS 42S	19	1600	250000	24	$185	$249	
5	ELS 85S	17	1800	250000	24	$229	$299	
27	ELS 127S	17	1800	250000	24	$319	$379	
70	ELS 170S	17	2000	250000	24	$349	$409	
40	LPS 240S	16	2300	250000	24	$499	$569	
25	LPS 525S	10	2900	350000	24	$1069	$1119	$1169
0 (Pwrbk)	GRS•80	17	1900	150000	12	$349		
20 (Pwrbk)	GRS•120	17	1800	150000	12	$469		
60 (Pwrbk)	GRS•160	17	1900	150000	12	$519		
oshiba								
70	MK-438	12	1500	250000	36	$1099	$1159	$1199
2 GB	MK-538	12	2800	250000	36	$1449	$1499	$1549
C								
05GB	DSP-3105	9.5	2600	250000	60	$1799	$1849	$1899

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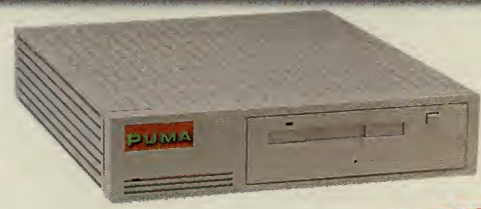

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- Optical reliability (10 year data life)

Puma™ 256 MB 3.5" Drive $1799

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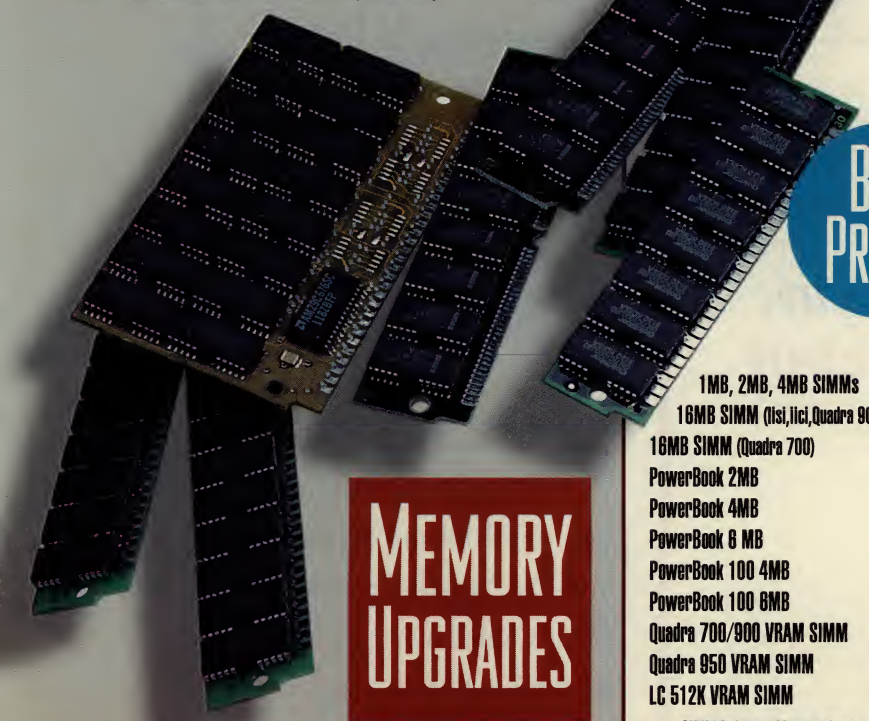

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Radius Rocket, Rocket 33, Rocket 25i	CALL
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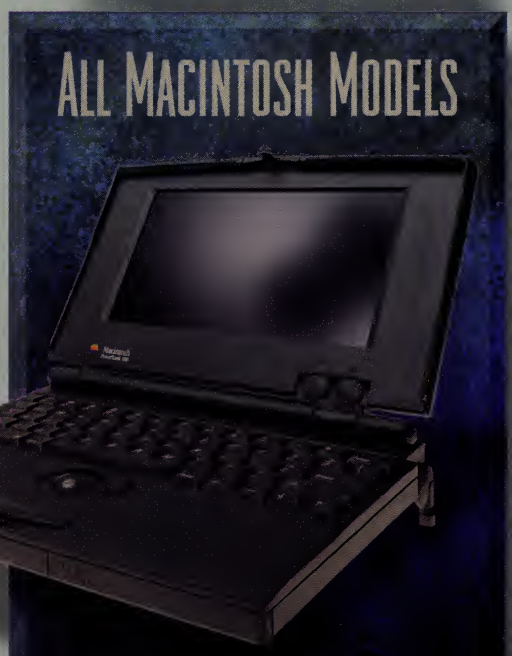

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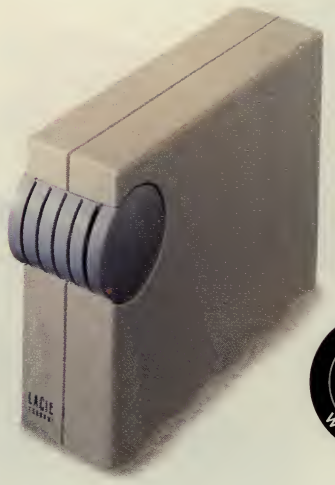

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240MB (3½")	$419	$479	$529	$579
525MB (3½")	$939	$999	$1049	$1099
700MB (3½")	$1199	$1259	$1309	$1359
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120MB (2½") for Powerbook	$449	See PocketDrive		
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2.1GB (5¼")	$2949	$3099
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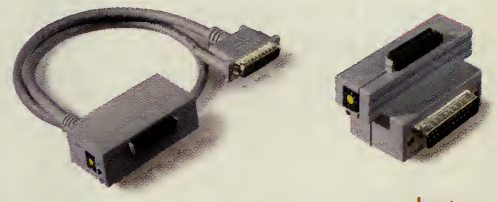

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Model	
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External SyQuest 88mb C** (*One Cartridge Inc.)	$589
Internal 44mb SyQuest (for Quadra 900&950)	$349
Internal 88mb SyQuest (for Quadra 900&950)	$469
Internal 88mb C SyQuest (for Quadra 900&950)	$559
External SyQuest Dual 44mb (*One Cartridge Inc.)	$725
External SyQuest Dual 88mb (*One Cartridge Inc.)	$895
External SyQuest Dual 44/88mb (*One 44 & One 88 Cartridge)	$895
External SyQuest Dual 88C mb (*One Cartridge Inc.)	$1075
External SyQuest Dual 44/88C mb (*One 44 & One 88 Cartridge)	$999
SyQuest 44mb Cartridge/10 Pack	$63/$620
SyQuest 88mb Cartridge/5 Pack	$97/$480

All SyQuest Drives come with FWB™ HDT Formatting Software. SyQuest carries a TWO year Warranty on Drives and ONE year on Cartridges.
* READS AND WRITES 44 AND 88 CARTRIDGES. Does not format 44 cartridges.

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"An Apple Authorized Brand"

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ELS 170mb	17ms	3.5"TH	$309	$369
LPS 105mb	10ms	3.5"TH	$249	$309
LPS 240mb	10ms	3.5"TH	$399	$459
LPS 525mb	10ms	3.5"TH	$899	$959
Pro 425mb	9ms	3.5"TH	$859	$919
Pro 700mb	10ms	3.5"TH	$1179	$1239
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Pro 1.2gb	10ms	3.5"HH	$1579	$1639
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*GO•120mb	16ms	2.5"PB	$399	$499
*GO•160mb	16ms	2.5"PB	$499	$599

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RICOH

Model	Speed	Size	External
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128mb	45ms	3.5"HH	$1075
128mb/650mb Cartridge			$29/95

Maxtor®

Model	Speed	Size	External
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1.0gb Optical Glass Cartridge			$225

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4.0gb - 8.0gb HC Turbo	$1485
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TEAC

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CD-ROM				
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Toshiba carries a THREE year Warranty on drives. ONE year Warranty on CD Rom.
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1.6gb	14ms	5.25"FH	$1945	$2045
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FIVE year Warranty.
FWB™ HDT Formatting Software Included.

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"An Apple Authorized Brand"

Unformatted Capacity	Speed	Size	Internal	External
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120mb	19ms	3.5"TH	$279	$339
170mb	13ms	3.5"TH	$309	$369
212mb	12ms	3.5"TH	$415	$475
540mb	12ms	3.5"HH	$979	$1039

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FWB™ HDT Formatting Software Included.

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2.0gb	15ms	5.25"FH	$2299	$2399
2.4gb	12ms	5.25"FH	$2499	$2599

FIVE year Warranty.
FWB™ HDT Formatting Software Included.

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213mb	15ms	3.5"TH	$375	$435
340mb	15ms	3.5"HH	$625	$685
535 mb	12ms	3.5"HH	$955	$1015
540 mb NEW!	9ms	3.5"HH	$1055	$1115
1.2gb NEW!	9ms	3.5"HH	$1655	$1715
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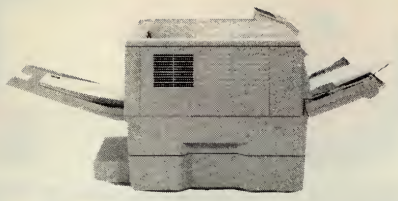

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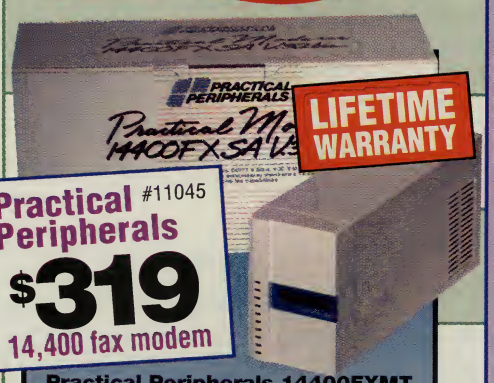

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5970.....Optima 96 - V.32, V.42, V.42bis.....389
8186.....Optima 14,400 - V.42, V.42bis.....439
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8168.....Optima 96 + 96 S/R fax - V.32 379
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11223...SupraFax Modem V.32bis 339
11247...SupraFax Modem Plus 142

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4698.....VXV.32bis 14,400 - V.42, V.42bis..227
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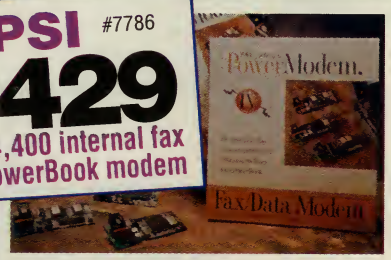

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3298 ...Sony 3.5" FDHD Disks .....(10) 14
6375 ...Sony 3.5" FDHD Disks .....(30) 39
2214 ...Fuji 800k Disks .....(10).....9
2242 ...Fuji 800k Disks .....(50) 32
7758 ...Fuji 3.5" HD Disks formatted (11) 14
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10440 ..Komag - 128, 3.5" Optical ...(3)..109
10442 ..Komag - 128, 3.5" Optical ...(5)..175
10441 ..Komag - 128, 3.5" Optical ..(10).339

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1603.....Sony - DG60m DAT Tape Cartridge .16
2520.....Sony - DG90m DAT Tape Cartridge .16
7671.....TEAC - 60 MB Cartridge 16
10834...TEAC - 60 MB Cartridge 10 pack....139
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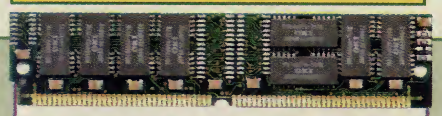

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2199.....(4) 1 MB SIMM - 80ns/30-pin 156
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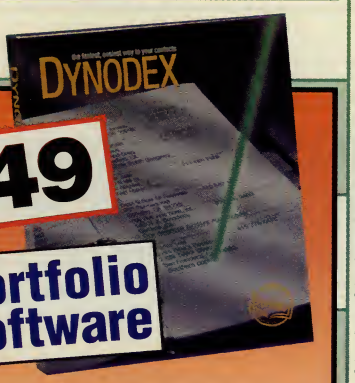

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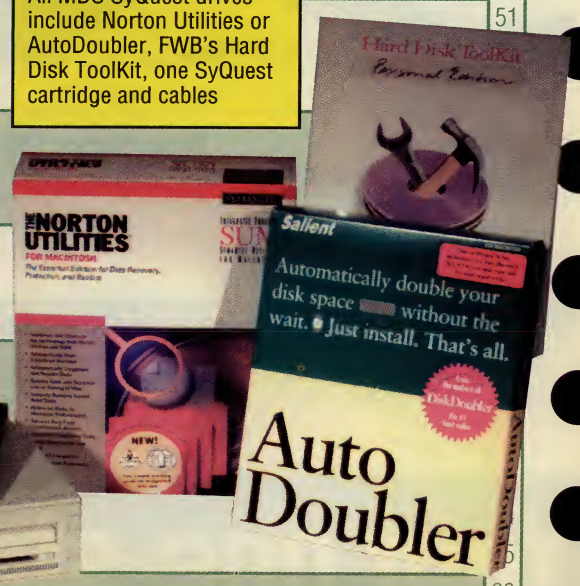

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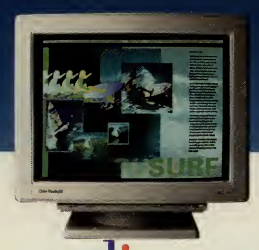

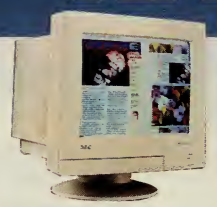

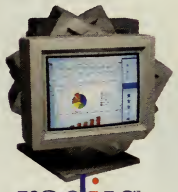

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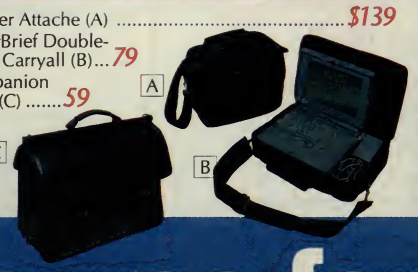

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Scan 800	$1,199	800	200	8.5 x 11.75	■			Includes Scan-Match color calibration software
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Transparency Option	729	(800)	(51)	6 x 9	■	■	■	
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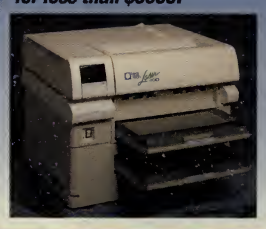

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	Price
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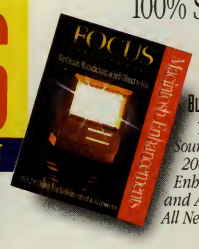

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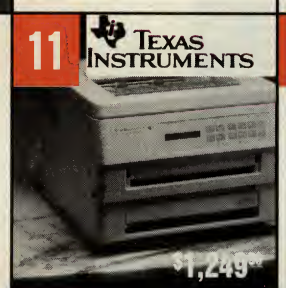
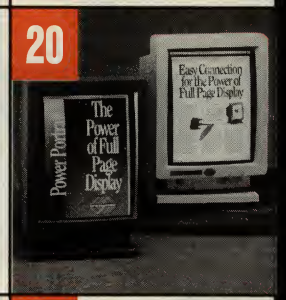
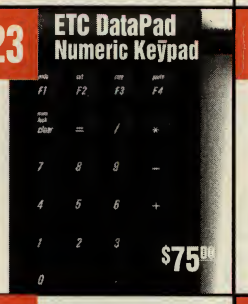
7 **ETC SyQuest 88R DataDrive** A 4-mice rating from MacUser has made this the best selling ETC drive! $489.00	SyQuest **ETC SyQuest Specials** The #1removable media drive is available as an internal kit for the new CPU's or in dual configurations. Call	9 ETC PowerGlide Extended Keyboard $99.00	10 SONY **SONY 1604 16-inch Trinitron Monitor** Using the Trinitron tube, the SONY 1604 offers a razor sharp image at a great price. $1125.00	11 Texas Instruments  $1,249.00	12 TOSHIBA **1.2 Gigabyte External Hard Disk Drive** A reliable drive with a lot of storage room at a very good price. Features ETC Tools. $1,599.00	13 Quantum **85MB Internal Hard Disk From Quantum** From the new ELS family, this economical drive is our best seller. External for $260.00 $201.00
14 	15 SII **Seiko Instruments CM-1445 14" Monitor** Using Trinitron technology, this 14-inch RGB monitor is over a $50.00 less expensive than Apple! $489.00	16 DAYSTAR DIGITAL **50MHz PowerCache with Math Coprocessor** Drop one of these in your Macintosh and race past everyone else. $859.00	17 CLUB 24	18 E-MACHINES **E-Machines Futura SX** Undoubtedly, this is the best selling 24 bit video card around. Gives you 24 bit resolution on all 13 & 14" monitors. $489.00	19 SIGMA DESIGNS **Sigma Designs Power Portrait** A three star winner from MW Labs, this 15-inch portrait monitor plugs into your SCSI port. $639.00	20 
21 radius **Radius VideoVision** Let your imagination run wild when you capture video for QuickTime movies or output to a VCR tape, all at 24 bit. $1,989.00	22 AE **Applied Engineering DataLink PB** Internal voice, 14.4 data and Fax communications system for your PowerBook Call	23 ETC DataPad Numeric Keypad  $75.00	24 RasterOps **RasterOps MoviePak** This daughterboard for the S//X is designed for full motion video with realtime JPEG compression/decompression $1,529.00	25 UMAX UC-630 600 dpi Color Scanner $1,149.00	26 **Snooper 2.0 The Hardware Diagnostic for the Macintosh** The next time you see a "Sad Mac" on your screen or your Mac's performance isn't up to par, diagnose from your desk with SNOOPER. the best-selling new standard for Mac diagnostics and testing tools. SNOOPER performs over 250 tests,	27 checks all your hardware and identifies any problems. And the same Snooper runs on all Macs. SNOOPER is very easy to use and includes complete performance bench marking plus an emergency diagnostic boot disk and more! *Get a FREE copy of VIREX* $129.00
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Terms and Conditions: Payment: Mac and MORE accepts Visa, MasterCard, Discover, CODs, and Purchase Orders. We will ship CODs with pre-authorized checks. Corporate and School Purchase Orders are Net-15 for orders over $2500 only, and are subject to credit approval . Warranties: All warranties on Macintosh or Apple brand products sold by Mac and More will be honored by Mac and More or its authorized agents only. Mac and More does not guarantee compatibility. Like all other Mail-Order resellers, Mac and More is not an authorized Apple reseller. All other manufacturers warranties are honored by Mac and More and the original manufacturer. Returns: All orders returned or refused will be charged a minimum 15% restocking fee. Call for an RTS before returning. Returns must be in original packing with software seals unbroken. Shipping: For advertised items totaling over $1000 we will ship to destinations in the continental US at no charge. Some large items may not be included in this offer. Ask for details when ordering. Terms, Conditions, and Prices are subject to change without notice or obligation. All products sold by Mac and More are new. We do not sell used equipment.
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Timberlake peripherals INC

5595 Cecilia Circle • Edina, Minnesota • 55435 • **(800) 723-1077**

SCSI ARROW ACCELERATOR CARD

$795

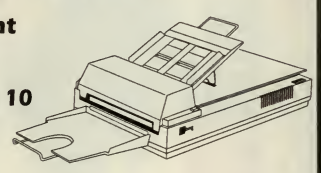
SCSI ARROW ACCELERATOR CARD:

- Auto Boot at startup mounts all devices
- NuBus™ Bus Master
- Supports Fast SCSI-II Transfers up to 10MB per Second Burst
- Asynchronous I/O support lets the MAC continue processing during I/O
- Supports Quadra Burst Mode Transfers
- Supports Multiple Logical Units for Advanced Future SCSI Devices
- Furnished complete with internal and external SCSI cables and formatting software
- "Real World" speedup of up to 250%

SCANNER

Do You do Document Image Processing? if so...read on!

FUJITSU SCANPARTNER 10



- Bundled with Optics by Blueridge Software & Document Image Processing Software
- 10 Pages per minute
- 50 Page Automatic Document Feeder
- 300 DPI/256 grey scale

$1995

Techknowledge

Access Time:

Access time of a hard drive is calculated by adding the seek time and rotational latency.

Seek is determined by the amount of time from issuance of a read and write command to the positioning of the read-write head to the track on the hard drive of the desired data. Seek can be influenced by SCSI command overhead, and the distance that the head must travel from its present location to the location on the drive of the desired data. Drive manufacturers and integrators will typically quote average seek time.

Rotational Latency is the average amount of time for the actual location of the data to pass under the read-write head after the seek is complete. Latency is influenced by the rotational speed of the media.

For example, the Quantum ProDrive® LPS525 mechanism has an average seek of 10 milliseconds and an Average Rotational Latency of 6.7 milliseconds for a subtotal of 16.7 millisecond Access Time. When we factor in SCSI command overhead, an Access Time of 19 milliseconds would be very good on the Macintosh. In fact, in the TimberLake testing, this is what was achieved.

For a complete list of Seek, Latency, and Access times for all TimberLake Peripheral Drives, or if you have other questions, please call us and our Sales and Technical staff will be happy to assist you in your search for quality Macintosh® Peripherals.

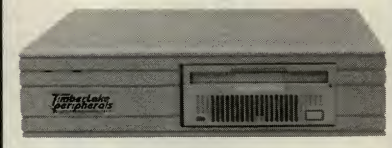
EPSON LASER PRINTER

MODEL EPL-7500

- Appletalk Serial & Parallel Interfaces
- 300 DPI
- 2MB Ram Exp. to 6 MB
- 250 sheet cassette standard
- Adobe postscript level 1 & PCL 4
- 35 Postscript fonts
- 6 pages per minute
- 2 year warranty

$995

OPTICAL DRIVE



- "TLP" External MO Drive Epson Mechanism
- 128MB Storage
- Average seek of 35ms
- Fully compatible with all ISO & ANSI specifications

Price with 1 cartridge **$1195**

Additional cartridges **$49.00**

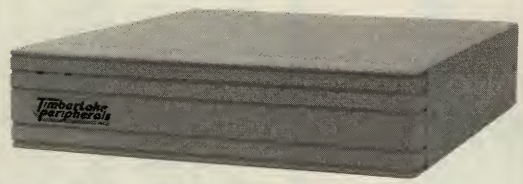
SIMMS

SIMMS:

- 1MB, 2MB, 4MB, 8MB, 16MB
- VRAM SIMMS
- Powerbook Modules
- ***Call for latest prices***

72 PIN SIMMS for newest Macs Available

HARD DRIVES



240 MB Quantum Internal

ONLY $427

2 Year Warranty:

Quantum		Internal	External
42MB	(3.5")	$197	$269
85MB	(3.5")	$229	$295
127MB	(3.5")	$309	$375
170MB	(3.5")	$345	$415
240MB	(3.5")	$449	$519
525MB	(3.5")	$1065	$1119

5 Year Warranty:

700MB	(3.5")	$1369	$1439
1.05GB	(3.5")	$1519	$1579
1.2GB	(3.5")	$1735	$1810

5 Year Warranty:

Fujitsu		Internal	External
330MB	(3.5")	$825	$895
420MB	(3.5")	$875	$945
520MB	(3.5")	$945	$1015
1.2GB	(3.5")	$1556	$1612
1.2GB	(5.25")	$1295	$1465
1.6GB	(5.25")	$2255	$2425
2.1GB	(5.25")	$2505	$2675

Go Drives for Powerbook:

		Int.	Ext.
80MB	(2.5")	$355	$455
120MB	(2.5")	$449	$549
160MB	(2.5")	$579	$679

Visa/Mastercard, COD, Corporate, Gov't, University PO's Accepted. 30 day money back guarantee.

All returns need RMA #.

Prices, terms and specifications subject to change without notice.

M-F 7:30-6:30 CST Sat 10-2 CST

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(800) 723-1077

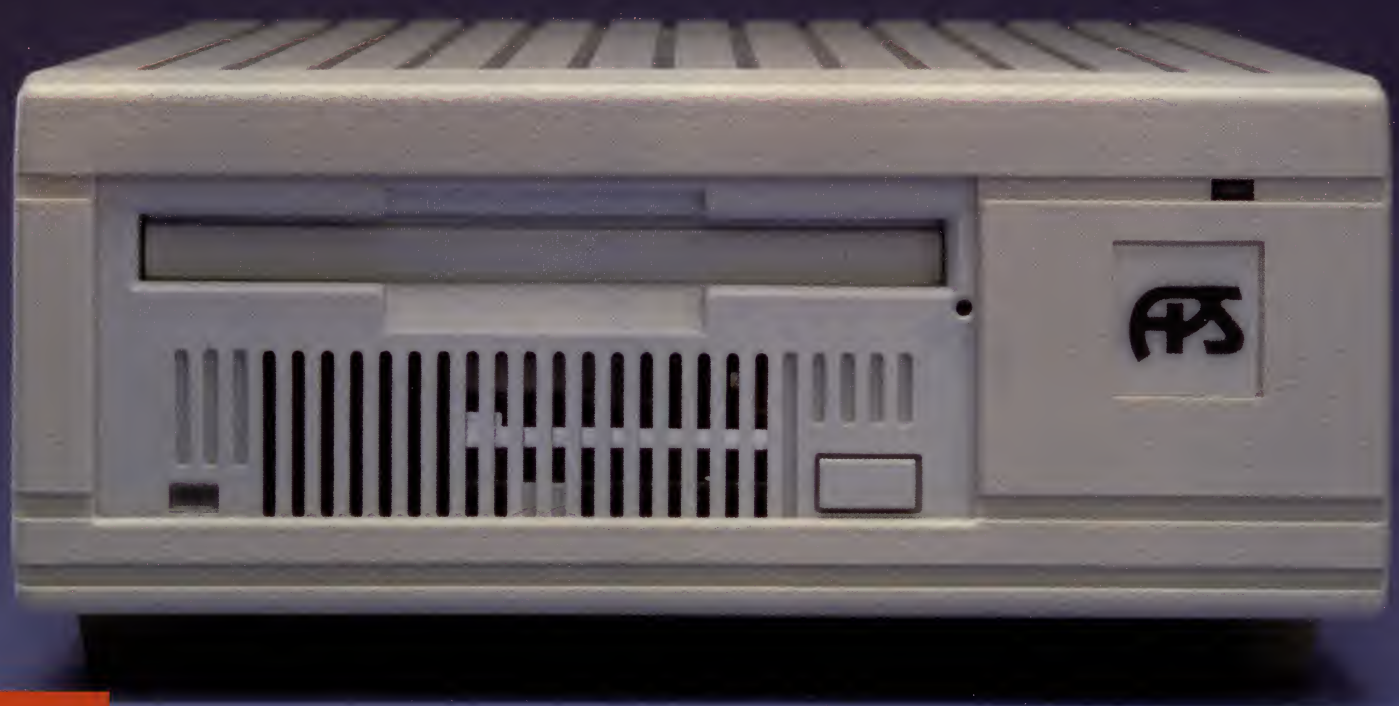
MasterCard

(612) 941-6670 or FAX (612) 941-6730

Timberlake peripherals INC

128MB OPTICAL SOLUTION

APS Epson 128 MO, $1199



Internal for Quadras $1099

PROVEN MO TECHNOLOGY avoids data integrity problems common to other removable drive systems. Now, transport, store and access multi-megabyte documents on low-cost, high-density MO cartridges with Epson's Magneto Optical Drive system. Epson's MO stores 128MB on durable $49 diskettes. Carry them in your pocket or send them to your output service—these cartridges can take a beating.

Three-pass write assures data security

With the dependable security of a three-pass write, keep copies of scanned artwork, multimedia or large documents for future reference or emergency back up.

Easy-access archiving

Based on Epson's OMD-5010 mechanism, this state-of-the-art drive supports an average seek time of 35 milliseconds and sustained read times approaching 700KB per second.

The three-pass write occurs at approximately 250KB per second in a Mac environment, making it among the fastest 128MB MO units currently shipping.

This Epson MO is fully compatible with all ISO and ANSI specifications, so cartridges can be readily accessed on other-brand MO drives.

In a specially designed external enclosure (with extra cooling for reliable operation), APS's 128MB Epson MO is priced at $1199, including one MO cartridge. An internal version for Mac Quadra 900 or 950 is $1099. Additional cartridges are available at $49 each—a package of five for $240 or a package of ten for $400.

The APS 128MB Epson MO carries a one-year manufacturer's warranty and includes APS's award-winning service and unlimited toll-free technical support. Plus, every APS drive includes Dantz Development's easy-to-use backup software DiskFit Direct, a $49.95 value.

DiskFit Direct
INCLUDED

Go ahead and buy it

Move up to this next-generation, transportable storage solution. Call APS to order an Epson MO today!

30-Day Money-Back Guarantee

Unlimited Toll-Free Technical Support

Disk-For-Disk Replacement Warranty

24-Hour BBS with Our Latest Software

Bright, Knowledgeable Sales Associates

APS Technologies • 800 645-5401

APS TECHNOLOGIES

Blistering Performance

APS Fujitsu 1.2G 3.5", $1799

External Fujitsu 1.2GB $1899

FINALLY, YOU CAN GET FUJITSU'S rugged reliability as well as unbelievable performance in a 3.5" package with the new APS Fujitsu 1.2GB drive. With a 5400 RPM spindle speed, an outstanding 3.9MB /sec. transfer rate, an average seek under 10ms, a five-year warranty *and* APS's legendary service and technical support, this is *the* drive to get for all your high performance disk I/O storage.

Quantum

MB	INTL	EXTL
240	$459	$539
525	959	1029
1225*	1499	1569

*Includes new 5-year warranty

Quantum

ELS Low Profile Drives

MB	INTL	EXTL
42	$159	$219
85	199	269
127	299	369
170	339	409

Fujitsu

MB	INTL	EXTL
520	$949	$1049
1.2G 5.25"	1399	1499
1.2G 3.5"	1799	1899
2.0G	2299	2399

Includes new 5-year warranty

APS PowerBook Companion Cases

The Perfect Home for Your Original PowerBook Drive

AC only	$79
AC/DC (Battery-Powered)	169

Micropolis

MB	INTL	EXTL
560	$1299	$1369
1.1G	1699	1799
2.0G	2699	2799

Includes new 5-year warranty

Quantum

PowerBook Go•Drives

MB	INTL	EXTL
80GRS	$349	$499†
120	399	529†
160GRS	599	729†

†Battery-powered Companion Case for the PowerBook

Maxtor

MB	INTL	EXTL
120*	$229	$309
213*	349	409
340*	599	669
540*	1099	1199
1.2G**	1499	1599
1.7G**	1799	1899

*Includes 2-year warranty **Includes 5-year warranty

APS SCSI Boy $29

- *The Ultimate PowerBook Necessity*
- *Rugged Palm-Sized 25–30 PowerBook SCSI Adapter*
- *Carry Only One Cable*
- *Never Get Caught with the Wrong Cable Again!*

†Dealer Inquiries Welcome

APS Technologies

Great Prices. Priceless Support!

MACWORLD MW SERVICE HERO

The fastest DAT ever!
APS Turbo DAT, $1799

Internal for Quadras $1699

THE APS COMPRESSION DAT rated the MacWorld Editor's Choice for high capacity back-up. Now, get even better performance with the APS Turbo DAT. Based on Archive's Turbo Python DAT Mechanism, the fastest DAT unit available the APS Turbo DAT is more than 20% faster than all other DAT units. With a two-year warranty and 80,000 hr MTBF you'll probably never need APS's legendary support.

Toshiba

MB	INTL	EXTL
213	$699	$829†

†Battery-powered Companion Case for the PowerBook

1.2G	$1399	$1499

CD-ROM

3401-E1	$699	$749*

Fastest CD-ROM Drive Available
Double Speed, Multi-Session Photo CD Compatible
**Includes Four-Disc APS CD Bundle*

DAT

Mac USER LABS ★★★★ MW EDITORS' CHOICE

MB	INTL*	EXTL
APS TurboDAT	$1699	$1799
APS DAT	1149	1249

**Internal models for Quadra 900 & 950*
All APS DAT Drives Include Retrospect by Dantz

Epson MO

Model	INTL	EXTL
128	$1099	$1199

128MB Magneto Optical Drive

SyQuest

MW EDITORS' CHOICE

Model	INTL	EXTL
SQ555	$349	$389
SQ5110	469	489
SQ5110c	569	599

The 5110c reads & writes 44 & 88 carts!
SyQuest Cartridges 44/88.....$65/100
Preformatted Cartridges 44/88.....$70/105

TEAC

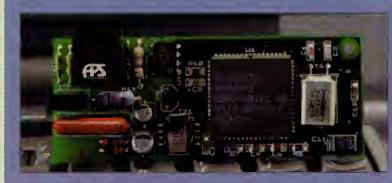
MW EDITORS' CHOICE

155 MB Tape Back Up	$499
600 MB Tape Back Up	$799

All APS Tape Drives Include Retrospect by Dantz

APS Modems for PowerBooks $69

2400 baud *(9600 send fax/4800 receive fax)*



9600 baud v.32	$279
14,400 baud v.32 bis	$349

All APS Modems for the PowerBook include a 30-day MBG, comprehensive installation guide, and APS's Communications & Fax software.

30-Day Money-Back Guarantee

Unlimited Toll-Free Technical Support

Disk-For-Disk Replacement Warranty

24-Hour BBS with Our Latest Software

Bright, Knowledgeable Sales Associates

• **30-day money-back guarantee** • All drive products carry a 30-day money-back guarantee. Your risk in the transaction is the cost of shipping.
• **Disk-for-disk replacement warranty** • SyQuest, most Quantum, Maxtor and DAT drives are warranted for two years, Maxtor 1.2, 1.7 GB and Fujitsu drives are warranted for five years. WREN, Quantum 2.5" drives, TEAC drives, all CD-ROMs, MOs and SyQuest carts are warranted for one year. Toshiba 830 is warranted for three years.
• **Prices and specifications subject to change without notice. Refused orders subject to restocking fee.**

•**All our hard drives include brackets, cables, cords and LEDs required for operation** with the specified Macintosh. All hard drives from APS Technologies come preformatted with Apple's System 7.0.1 software, at least 9.2 MB of compacted publicly-distributable software, and APS Technologies' ALLIANCE POWER TOOLS SCSI formatter/hard disk partitioner.
• **Toll-free technical support as often or for as long as you need.** Regular hours are 8 am to 8 pm Monday thru Friday, 10 am to 4 pm Saturday, Central Time.

M–F 7AM–9PM CST. SAT 10AM–4PM CST.
Visa/Master Card, Discover, American Express: No Surcharge.
APS Technologies, 2900 S. 291 Hwy., Independence, MO 64057
International: 1-816 478-8300. FAX: 1-816 478-4596 (24 Hours).
Toll Free UK: 0800-897-545. Australia: 0014-800-125-875.

1-800 645-5401

APS TECHNOLOGIES

1-800-258-2622 1-800-CLUBMAC

Quantum

GO•Drives have 32k cache, low power consumption, MTBF of 150,000 hours, and ONE Year Warranty. ELS drives have 32k cache, low power consumption, MTBF of 250,000 hours and TWO Year Warranty. LPS drives have 64k-256k cache, MTBF of 250,000 hours, and TWO Year Warranty. PRO drives have 256k cache, MTBF of 350,000 hours, and TWO Year Warranty.

Unformatted Capacity	Model	Access Time	Actual MAC Capacity	Internal	External
GO•DRIVE (2.5" HARD DRIVES DESIGNED FOR NOTEBOOKS)					
80mb	GO80	17ms	80mb	$299	$399
120mb	GO120	17ms	120mb	$435	$535
ELS SERIES (3.5" LOW PROFILE AND LOW POWER)					
42mb	ELS42	19ms	40mb	$175	$235
85mb	ELS85	17ms	82mb	$215	$275
127mb	ELS127	17ms	124mb	$289	$349
170mb	ELS170	17ms	160mb	$319	$379
LPS SERIES (3.5" LOW PROFILE)					
105mb	LPS105	11ms	100mb	$255	$315
240mb	LPS240	10ms	234mb	$439	$499
525mb	LPS525	10ms	500mb	$919	$979
PRODRIVE SERIES (3.5" HALF HEIGHT)					
425mb	PRO425	9ms	406mb	$879	$939
700mb	PRO700	10ms	670mb	$1195	$1255
1.0GIG	PRO1050	10ms	1001mb	$1339	$1399
1.2GIG	PRO1225	10ms	1165mb	$1495	$1555

*6300 RPM!!

Maxtor

Unformatted Capacity	Model	Access Time	Actual MAC Capacity	Internal	External
XT SERIES (3.5" LOW PROFILE)					
120mb	7120S	15ms	121mb	$259	$319
207mb	7213S	15ms	202mb	$379	$439
LXT & MXT SERIES (3.5" HALF HEIGHT)					
330mb	LXT-340	15ms	324mb	$625	$685
FAST!! 535mb*	MXT-535	8.5ms	521mb	$999	$1059
FAST!! 1240mb*	MXT-1240	8.5ms	1150mb	$1659	$1719
PANTHER SERIES (5.25" FULL HEIGHT)					
1.2GIG	PO-12S	13ms	997mb	$1379	$1479
1.7GIG	P1-17S	13ms	1433mb	$1679	$1779

Maxtor 3.5" drives carry a ONE Year Warranty. Maxtor 5.25" drives carry a TWO Year Warranty.

Seagate

FEATURING... THE SEAGATE ELITE SERIES

Unformatted Capacity	Model	Description	Access Time	Actual MAC Capacity	Internal	External
3.5" DISK DRIVES						
248mb	ST3283N	Low Profile	12ms	235mb	$479	$539
1.2GIG	ST11200N	Half Height	10.5ms	1000mb	$1499	$1559
WREN AND ELITE SERIES (5.25" FULL HEIGHT)						
645mb	ST4767N	Wren Runner II	11.9ms	634mb	$1519	$1619
1.2GIG	ST41200N	Wren-7	15ms	989mb	$1375	$1475
1.6GIG	ST41651N	Wren-8	15ms	1350mb	$1715	$1815
2.1GIG	ST42100N	Wren-9	12.9ms	1900mb	$1935	$2035
1.6GIG	ST41600N	Elite-1	11.5ms	1307mb	$1999	$2099
2.4GIG	ST42400N	Elite-2	11ms	2050mb	$2879	$2979
3.4GIG	ST43400N	Elite-3	11ms	2750mb	$3929	$4029

Seagate drives carry a ONE Year Warranty.

FIVE YEAR WARRANTY

FUJITSU

Unformatted Capacity	Model	Description	Access Time	Actual MAC Capacity	Internal	External
425mb	M2623FA	3.5" Half Height	9ms	405mb	$895	$955
520mb	M2624FA	3.5" Half Height	9ms	496mb	$945	$1005
NEW 1.1GIG	M2694	3.5" Half Height	8.5ms	995mb	$1795	$1895
1.2GIG	M2266	5.25" Full Height	14.5ms	1029mb	$1395	$1495
2.0GIG	M2652	5.25" Full Height	14.5ms	1665mb	$2295	$2395
NEW 2.4GIG	M2654	5.25"Full Height	11.5ms	2000mb	$2519	$2619

HEWLETT PACKARD

FIVE YEAR WARRANTY

Unformatted Capacity	Model	Access Time	Actual Mac Capacity	Internal	External
3.5" HALF HEIGHT DRIVES					
234mb	C2233	12.6ms	223mb	$799	$859
422mb	C2235	12.6ms	402mb	$1049	$1109
REDUCED PRICE!! 1.2GIG	C2247	10.5ms	1000mb	$1525	$1585
5.25" FULL HEIGHT DRIVES					
677mb	97556	13.5ms	633mb	$1465	$1565
1.2GIG	97558	13.5ms	1020mb	$1665	$1765
1.6GIG	97560	13.5ms	1292mb	$1995	$2095
2.4GIG	CP3010	11.5ms	2000mb	$2989	$3089

1-800-258-2622 1-800-CLUBMAC

ClubMac 88c will allow you to read and write both 44mb and 88mb cartridges. Finally, there's one simple solution. Buy the drive that will offer complete compatibility with all SyQuest based cartridges. Buy the ClubMac 88c.

ClubMac SyQuest Dual Drives offer users the most convenient way to exchange data between cartridges.

Internal SyQuest Technology, essential for every Quadra 900/950, IIvx, IIvi and Performa 600 user, is available from ClubMac TODAY!

CLUBMAC 88c REMOVABLES*

ClubMac 88c External (SQ5110C)	$589
ClubMac 88c Internal	$559
ClubMac 88c Dual	$1079

* ClubMac 88c will read and write 44mb cartridges, but will not format 44mb cartridges.

CLUBMAC 44MB REMOVABLES

ClubMac 44mb External (SQ555)	$385
ClubMac 44mb Internal	$345
ClubMac 44mb Dual	$725

CLUBMAC 88MB REMOVABLES

ClubMac 88mb External (SQ5110)	$489
ClubMac 88mb Internal	$469
ClubMac 88mb Dual	$895

SYQUEST CARTRIDGES

44mb Cartridge	$63
88mb Cartridge	$97

NEW SyQuest 88c

FEATURING

SyQuest® REMOVABLE TECHNOLOGY

SyQuest Drives include
- TWO Year Warranty
- One cartridge and necessary cables
- SCSI Director™ Formatting Utility

SyQuest Cartridges carry a ONE Year Warranty.

FIVE YEAR WARRANTY

IOMEGA®

BERNOULLI TRANSPORTABLE

90mb $489 150mb $759

Includes ONE cartridge, cables and FIVE Year Warranty

IOMEGA CARTRIDGES

TriPack 90mb Cartridges	$389
TriPack 150mb Cartridges	$379

CONNER

Unformatted Capacity	Model	Description	Access Time	Actual MAC Capacity	Internal	External
85mb	CP30080E	3.5" Low Profile	17ms	82mb	$199	$259
170mb	CP30170E	3.5" Low Profile	17ms	160mb	$289	$349
212mb	CP30200	3.5" Low Profile	12ms	206mb	$369	$429
540mb	CP30540	3.5"Half Height	10ms	515mb	$899	$959

Conner drives carry a ONE Year Warranty.

ClubMac OPTICAL Drives

Model		Capacity	Description	Seek	External
CMO-OD3000	Teac	128mb	3.5" Half Height	45ms	$989
CMO-LF3004	Panasonic	128mb	3.5" Half Height	45ms	$1129
CMO-3100E	Ricoh	128mb	3.5" Half Height	45ms	$1089
CMO-5031E	Ricoh	594/652mb	5.25" Full Height	28ms	$2385
Tahiti II	MaxOptix	650mb/1.0GIG	5.25" Full Height	35ms	$3269
128mb Cartridge		3.5" Single Sided			$39
594/652mb Cartridge		5.25"-512/1024 bytes/sec			$99

All ClubMac Opticals include ONE cartridge and ONE Year Warranty.

GREAT Media PRICES

60 meter DAT	$13
90 meter DAT	$16
CT600N	$19
CT600F	$28
Exabyte 8mm	$18

ClubMac TAPE BACKUP Systems

Capacity	Model	Description	Media	Internal	External
155mb	Teac MT2ST/N50	Analog	CT600N	$429	$449
600mb	Teac MT2ST/F50	Analog	CT600F	$629	$649
2.0GIG	ARDat	DAT, DDS	4mm	$1165	$1185
2.0GIG	WangDAT 1300XL	DAT, DDS	4mm	$1249	$1269
3-5GIG	WangDAT 3200	DAT, DDS-DC	4mm		$1489
2.0GIG	HP 35470A	DAT, DDS	4mm	$1329	$1349
3-5GIG	HP 35480A	DAT, DDS-DC	4mm	$1529	$1549
2.2GIG	Exabyte EXB-8200	Digital/Helical	8mm		$1859
5.0GIG	Exabyte EXB-8500	Digital/Helical	8mm		$2849

Tape BackUp Systems include RetroSpect v.1.3c Backup Software, ONE cartridge and ONE Year Warranty.

ClubMac

1-800-258-2622

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HEWLETT PACKARD
Authorized Scanner Dealer

HP SCANJET IIc COLOR SCANNER $1295

- 400 dpi (800 dpi via interpolation) single-pass scanning delivers superior image quality in 24-bit color & 8-bit grayscale modes
- Exclusive HP AccuPage technology improves OCR accuracy
- Both image and text scanning mean maximum versatility
- Print-path calibration optimizes scan settings for selected printer

AUTOMATIC DOCUMENT FEEDER $499

ASK ABOUT $100 REBATE ON HP SCANJET IIc AUTO. DOC. FEEDER

ScanTastic™ ps for the HP ScanJet IIc $69

HP SCANJET IIp GRAYSCALE SCANNER $695

- 300dpi optical resolution delivers accurate, detailed scans
- 8-bit grayscale provides high-quality reproductions of photographs and illustrations
- HP AccuPage technology improves text recognition and formatting
- Print-path calibration optimizes scan setting for selected printer

AUTOMATIC DOCUMENT FEEDER $279

ASK ABOUT $50 REBATE ON HP SCANJET IIp AUTO. DOC. FEEDER

EPSON

ES-600C 1200 dpi $859

- 300 X 300 dpi optical resolution, 1200 dpi via interpolation
- Epson's TruePass Scanning System (single or multi-pass)
- 8-bit grayscale and 24-bit color scanning

ES-800C 1600 dpi $1119

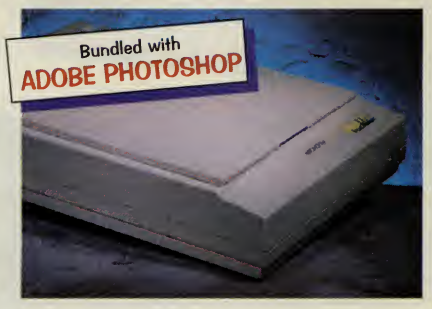
- 400 X 400 dpi optical resolution, 1600 via interpolation
- Epson's TruePass Scanning System (single or multi-pass)
- 8-bit grayscale and 24-bit color scanning

INTERFACE KIT $239

Interface Kit includes Full Version of Adobe Photoshop & Scantastic

ScanTastic™ ps	$69
Automatic Document Feeder	$465
Transparency Unit	$765

MICROTEK



SCANMAKER II $899

- Up to 1200 dpi resolution via interpolation
- 24-bit color/8-bit grayscale
- Bundled with Adobe Photoshop LE

SCANMAKER IIXE $1179

- Up to 1200 dpi resolution via interpolation
- 24-bit color/8-bit grayscale
- Bundled with FULL Adobe Photoshop

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100% Compatible — 30 DAY UNCONDITIONAL MONEY BACK GUARANTEE THROUGH PARTICIPATING DEALERS

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33 MHz TURBO 040 $1369
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CHARGER $795

POWERCACHE
(Classic, SE, LC, SE/30, II, IIx, IIcx, IIsi, IIci, IIvx, Performas)

	w/o FPU	w/ FPU
33 MHz PowerCache*	$385	$475
40 MHz PowerCache*	$555	$645
50 MHz PowerCache*	$729	$859
Equalizer LC	$169	$239
PowerCache Adapter	$40	

Macintosh Universal PowerCache Accelerator

* Cache Adapter not included

33MHz TURBO 040
100% compatible with any software that runs on a Quadra and any hardware that runs on a Mac IIci.

CACHE CARDS

FastCache IIsi / with 68882	$279 / 349
FastCache IIci	$215
FastCache 040 (128K - Q700/900)	$259
FastCache 040 (128K - Q700/900/950)	$399

EXPANSION BOARDS

DualPort IIsi	$165
PowerMath LC	$115

MEMORY...

STANDARD MAC

1mb X 8 SIMMS	$32
2mb X 8 SIMMS	$64
4mb X 8 SIMMS	$119
4mb with PAL SIMMS	$135
8mb SIMMS	$279
8mb SIMMS for Q700	$299
16mb SIMMS	$525
16mb Low Profile SIMMS	$539

MAC IIFX

1mb X 8 SIMMS	$34
4mb X 8 SIMMS	$129
8mb SIMMS	$285
16mb SIMMS	$539

CENTRIS 610/650

4mb Memory Module	$149
8mb Memory Module	$299
16mb Memory Module	$615

VIDEO RAM

256K VRAM for Quadras	$25
512K VRAM for LC, LCII, IIvx	$49

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6mb Memory Module	$205

POWERBOOK 160/180

4mb Memory Module	$169
6mb Memory Module	$245
8mb Memory Module	$325
10MB Memory Module	$419

DUO 210/230

4mb Memory Module	$229
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NEC SILENTWRITER

2mb Memory Upgrade	$99

APPLIED ENGINEERING

PowerBook Battery Conditioner Recharger	$99
Axcell Cellular Phone Connection	$279
Datalink (PB 140/145/170 or PB 60/180)	$495
3.5" 1.44MB External Floppy Drive	$229
Plus Drive Super Floppy for Plus, SE, Mac II	$299
Fastmath LC w/68882 16MHZ FPU	$109
Quadralink Multi-Serial NuBus Board	$195

MODEMS...

PTICEON 14.4 Fax/Data Internal Powerbook Modem includes FaxSTF and Microphone $299

US Robotics Sportster 14.4 Mac & Fax $315

FIVE YEAR WARRANTY

SUPRAFAXMODEM $349
14.4 S/R fax, 14.4 modem v.32bis, v.42bis, MNP 5 w/FaxSTF, Microphone& Software

PSI	PowerModem I	(24/96/48 S/R fax modem) $129
PSI	PowerModem II	(24/96/96 S/R fax modem) $225
PSI	PowerModem III	(96/96 S/R fax modem) $325
PSI	PowerModem IV	(14.4/14.4 S/R fax modem) $379

GLOBAL VILLAGE

POWERPORT (Internal PowerBook Fax/Modems)

PowerPort Bronze (24/96 S/R fax modem)	$179
PowerPort Silver (96/96 S/R fax modem)	$359
PowerPort Gold (14,400 S/R fax modem)	$419

TELEPORT (External Desktop Fax/Modems)

TelePort Bronze (24/96 S/R fax modem)	$189
TelePort Silver (96/96 S/R fax modem)	$359
TelePort Gold (14,400 S/R fax modem)	$419

NETWORKING...

Dayna

Etherprint ENET to LocalTalk (Built-in Thin BNC & AUI)	$325
Etherprint Plus Multi Dev Support (Thin BNC & AUI)	$425
Etherprint T Plus Multi Dev Support (10BaseT)	$425
Etherprint-T ENET to LocalTalk (10BaseT)	$325
DOS Mounter 3.0	$49
Daynaport SCSI/Link-3 PB ENET	$329
Daynaport SCSI/Link-T PB ENET	$285

ASANTÉ — 5 YEAR WARRANTY

Mac SE (68000 PDS)		
MC3SE	Thick/Thin/10BaseT, 32K	$199
MC+SEET	Thick/10BaseT, 32K	$149
SCSI Products		
EN/SC10T	10BaseT, Includes SCSI Cable	$239
EN/SCPB	SCSI Cable w/ HPDI-30 & DB-25 for PB	$45
FriendlyNet Adapters		
FNTNA	Thin FriendlyNet Media Adapter	$79
FNTKA	Thick FriendlyNet Media Adapter	$79
FN10TA	10BaseT FriendlyNet Media Adapter	$79
10BaseT Hubs		
10THUB/12	10BaseT Hub w/12 10T, Thick&Thin Port	$479
AH1701	12-port Smart Hub w/SMNP H/W Module	$899
EtherTalk to LocalTalk		
AP1002	AsantePrint, Thick/Thin	$319
AP1001	AsantePrint, Thick/10BaseT	$319
Mac II Family & Performa 600 (NuBus)		
MC3NB	Thick/Thin/10BaseT, 64K	$199
MC+IIE64	Thick/Thin, 64K	$149
MC+IIET64	Thick/10BaseT, 64K	$149
Mac IIsi & SE/30 (68030 PDS)		
MC3IISI	Thick/Thin/10BaseT, 64K, FPU Socket	$199
MC+30IE64	Thick/Thin, 64K, FPU Socket	$149
MC+30IEMC64	Thick/Thin, 64K, FPU Chip	$245
Mac LC, LCII & Performa 400 (68020, 68030 PDS)		
MC+LCII	Thin/10BaseT, FPU Socket	$199
MCLC10TII	10BaseT, FPU Socket	$149
MCLC10TMCII	10BaseT, FPU Chip	$245

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VIDEOVISION PRESENTATION SYSTEM INCLUDES ADOBE PREMIERE 2.0

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Color Display/21	$2319
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PrecisionColor Display/20 or 20S	$2319

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Full Page Display / Pivot Display	$569 / 699
Two Page Display/19	$879
Two Page Display/21/ Two Page Display21E	$1149 / 1299

RADIUS INTERFACES

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PowerView	$489
PrecisionColor 8XJ	$489
PrecisionColor 24X	$1629
PrecisionColor 24XP / 24XK	$489 / 819
Two Page / Full Page	$375 / 189

ACCELERATORS

Rocket 25i / 33	$1199 / 1949
RocketShare NEW LOWER PRICE!!	$399
SCSI-2 Booster	$249

VIDEOVISION (BASIC SYSTEM) $1625
VIDEOVISION (PRESENTATION) $1929

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Everything you need to create hot desktop video presentations. Mix and record high-quality video, audio, and Macintosh graphics to videotape. **VideoVision** integrates QuickTime and other multimedia applications by providing computer graphics display, video input, video output on a single card.

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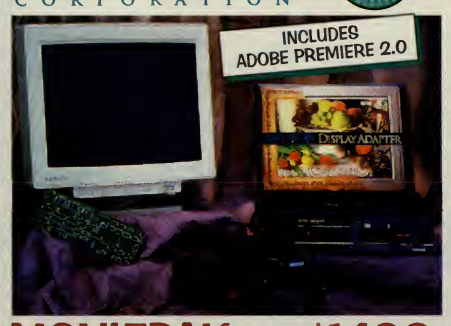

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MoviePak is the real-time JPEG compression-decompression daughterboard for full-motion video digitizing and full-screen QuickTime playback along with full featured video editing software. MoviePak allows full-motion QuickTime video digitizing to RAM or hard disk and full-screen playback using Apple's QuickTime. MoviePak includes RasterOps MediaGrabber 2.1 application for complete control over the video and sound digitizing process.

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Custom Color 20" System (20T MultiScan Monitor & 24XLi)	$3799
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PhotoPro NuBus NEW LOWER PRICE!!	$589
Video Expander II (NTSC)	$529

GRAPHIC DISPLAYS

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15" Mono/GS Portrait (1510)	$499

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RasterOps 24XLi / 8XLi	$1889 / 909
Paintboard 24 NEW LOWER PRICE!!	$1449
Paintboard Li	$815
ColorBoard 264/SE30	$699

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The easiest way to get full-motion video on your Macintosh. The single-slot, digital-video frame grabber enables you to make QuickTime movies with any Mac LC, IIsi or NuBus system.

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Add large-screen color to your PowerBook with the SuperView Display Expander from SuperMac. With the SuperView, you can connect your PowerBook 140 or 170 to large-screen displays, presentation projection systems and even TV monitors

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SuperMatch 20 Dual-Mode Trinitron (9751)	$2449
SuperMatch 20•T Multimode Trinitron (9752)	$2449
SuperMatch 20 Color (9782)	$1479
SuperMatch 17 Multimode (9730)	$1149
SuperMatch 17•T Trinitron (9735)	$1049
Platinum 21 Two-Page Display (9761)	$989

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Spectrum/24 PDQ Plus NEW LOWER PRICE!!	$1515
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√ 3 YEAR ON-SITE WARRANTY

MacUser
September 1992
Silentwriter Model 95

MODEL 97 $1749

- Adobe PostScript Level 2 • 10 ppm • 35 fonts
- 2 MB RAM • Auto Interface Monitor Switching
- HP LJ III Emulation • Parallel, Serial, AppleTalk
- 250-sheet Paper Capacity
- Built-in Envelope Feeder

MODEL 95FX $1849

- Model 95fx with a built-in plain paper fax
- Fax from any MAC or DOS/Windows PC using the software included with the printer
- The Model 95fx can send & receive faxes to/from any standard fax machine or other Model 95fx

MODEL 97FX $2199

MODEL 95F

- Adobe PostScript Level 2
- 6 ppm • 35 fonts • 2 MB RAM
- Auto Interface Monitor Switching
- HP LJ III Emulation • Parallel, Serial, AppleTalk
- 250-sheet Capacity • Built-in Envelope Feeder

$1369
LESS MFG REBATE -$250
$1119

SILENTWRITER OPTIONS

250-sheet Universal Cassette (95/95f/95fx)	$215
250-sheet Universal Cassette (97/97fx)	$215
250-sheet Legal Cassette	$69
2MB Memory Upgrade	$99
Face-Up Tray	$35
EP Printer Cartridge	$195

NEC COLOR MONITORS AND DISPLAY INTERFACE CARDS

The 15", 17" and 21" NEC MultiSync FG Display Solutions for the Mac II family and the powerful Quadra series. MultiSync FG monitors combine features that compliments the Macintosh computer and advance screen performance for brighter, sharper, more accurate images.

- AccuColor Control System with 4FG, 5FG, 6FG
- Larger, more accurate Images
- Comp. w/with LC, LCII, II family , Quadras, NEW Macs
- Multiple-frequency
- 0.28mm trio dot pitch
- TWO Year Warranty

15" MULTISYNC 3FGX $609

MACWORLD EDITORS' CHOICE March 1992

- Perfect for general business, presentation, business graphics, paint programs
- Maximum resolution of 1024 x 768
- Invar Shadow Mask • MPR-II compliant

BUY a NEC 3FGx or NEC 4FG with the NEW MacFG 24Xp Video Card and RECEIVE $100 from NEC

15" MULTISYNC 4FG $729
ACCUCOLOR CONTROL SYSTEM

MacUser September 1992

- Perfect for general business, color-intensive business graphics, presentation, multimedia applications, paint programs, 24-bit imaging
- Maximum resolution of 1024 x 768

4FG & MACFG 8X $1359
4FG & MACFG 24X $1919

17" MULTISYNC 5FG $1299
ACCUCOLOR CONTROL SYSTEM

MacUser January 1993

- Perfect for large screen business applications, desktop publishing, multimedia applications, paint programs, 24-bit imaging
- Resolution of 1024 x 768 at 82 dpi

5FG & MACFG 8X $1929
5FG & MACFG 24X $2489

21" MULTISYNC 6FG $2349
ACCUCOLOR CONTROL SYSTEM

MacUser September 1992
MACWORLD EDITORS' CHOICE September 1992

- Perfect solution for professional color desktop publishing, large screen business applications, multimedia paint program, 24-bit imaging
- Supports 1152 x 870 dual page mode

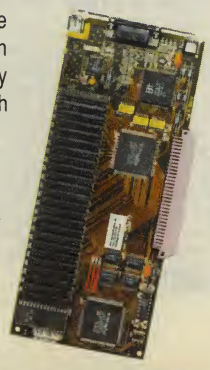
6FG & MACFG 8X $2979
6FG & MACFG 24X $3539

FREE 21" MULTISYNC MONITOR LENS FROM NEC ($199 VALUE)

NEC MACFG COLOR DISPLAY INTERFACE CARDS

The MacFG Color Display Interface card, engineered in conjunction with Radius, gives you flexible display capabilities seamlessly integrated with each of the MultiSync FG monitors.

- NuBus QuickDraw accelerated display interface cards
- Supports Mac II family and Quadras
- Offered in 8-bit and 24-bit color models
- Offers multiple display modes with real time switch on the fly between display modes



MacFG 24Xp $499

- Supports 24-bit color depth, 16.7 million colors
- On-board QuickDraw acceleration
- Supports the MultiSync 3FGx, 4FG, 5FG

MacFG 24X $1199

- Supports 24-bit color depth, 16.7 million colors
- On-board QuickDraw acceleration
- Supports up to 1152 x 870 resolution
- 3 MB of fast VRAM

MacFG 8X $639

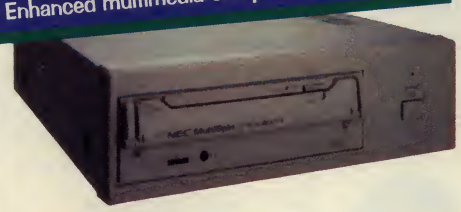
- Supports 8-bit color depth
- Upgradeable to 16-bit or 24-bit
- On-board QuickDraw acceleration
- Supports up to 1152 x 870 resolution

NEC EVERYTHING YOU NEED TO ENTER THE FASCINATING WORLD OF CD-ROM

NEC MULTISPIN CDR-74 $619

World's first multi-speed CD-ROM reader, the Multimedia (MPC) and QuickTime compliant NEC CDR-74. The NEC MultiSpin CDR-74 features

- Kodak's Multisession Photo CD compatible
- SCSI-2 • 280ms access time • 256k cache
- Enhanced multimedia compliance



- 280ms access time
- SCSI-1/SCSI-2 embedded interface
- 300KB data transfer
- 256K continuous flow cache
- **Kodak's Multisession Photo CD**
- **MultiSpin technology**: CD spins twice as fast when accessing data
- Switchable power supply (120V/22V)
- Double-Door Dust Protection
- Includes MAC Interface Kit
- TWO Year Warranty

NEC MULTIMEDIA GALLERY $799

- QuickTime compatible NEC CDR-74 CD-ROM reader with MultiSpin technology
- MAC Interface Kit
- Amplified stereo speakers & headphones
- TWO Year Warranty
- 6 interface CD-ROM software titles

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GREAT WONDERS OF THE WORLD, VOLUME 1
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THE NEW GROLIER MULTIMEDIA ENCYCLOPEDIA
THE SOFTWARE TOOLWORKS U.S. ATLAS

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- MAC Interface Kit
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THE FAMILY DOCTOR
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(2) KODAK PHOTO-CD ACCESS SOFTWARE & PHOTO SAMPLE CD-ROM

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NEC CDR-74 with PC Interface	$649
NEC Multimedia Gallery for PC	$799
NEC CD Express for PC	$395

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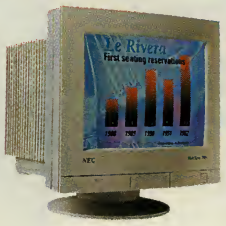

NEC MultiSync® Monitors

All NEC monitors include Tilt/swivel base and are Mac® II/Quadra family compatible (w/cable adapter)

3FGx™ 15" Monitor — $609

- 1024 X 768 **Non-Interlaced** @ 60 Hz
- .28mm Trio dot pitch
- 65 MHz max. video bandwidth

D1-NEC3FGX SRP $799
MAC CABLE PART # *F1-MACADP*

4FG™ 15" Monitor — $709

- 1024 X 768 **Non-Interlaced** @ 70 Hz
- .28mm Trio dot pitch
- 75 MHz max. video bandwidth

D1-NEC4FG SRP $949
MAC CABLE PART # *F1-MACADP*
4FG + MacFG™ 8X display interface card $1359
4FG + MacFG™ 24X display interface card $1919

5FG™ 17" Monitor — $1249

- 1280 x 1024 **Non-Interlaced** @ 74 Hz
- .28mm Trio dot pitch
- 135 MHz max. video bandwidth

D1-NEC5FG SRP $1599
MAC CABLE PART # *8325FG*
5FG + MacFG™ 24X display interface card $2459

6FG™ 21" Monitor — $2299

- 1280 x 1024 **Non-Interlaced** @ 74 Hz
- .28mm Trio dot pitch
- 135 MHz max. video bandwidth

D1-NEC6FG SRP $2899
MAC CABLE PART # *8325FG*
6FG + MacFG™ 24X display interface card $3499

SONY

CPD-1304 14" Multiscan® Trinitron® Color Monitor — $569

- 1024 x 768 **Non-Interlaced**
- .25mm Trio dot pitch
- 50MHz bandwidth (typical)

D1-S1304

CPD-1604S 17" Multiscan® Trinitron® Color Monitor — $1049

- 1024 x 768 **Non-Interlaced**
- .25mm Trio dot pitch
- 60MHz bandwidth (typical)

D1-S1604 SRP $1700
MAC ADAPTER *TMACSTD* $16.95

NEC MacFG™ 8X/24X Color Display Interface Card

Combine the MacFG 8X or 24X with a MultiSync® FG™ monitor for the ultimate graphics subsystem for your Macintosh computer.

MacFG 8X	MacFG 24X
$659	$1229
FG8X SRP $799	*FG24X* SRP $1499

EPSON

42% Faster*

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Color Scanners

- 24-bit "TruePass" scanning capable of producing over 16.6 MILLION colors!
- ES-600C - SCSI I/F, 300 DPI
- ES-800C - SCSI & BIDI I/F, 400 DPI
- Optional Automatic Document Feeder and Transparency Unit

MAC Interface Kit: $289
- Adobe® Photoshop® 2.0
- PIM and DA Cable
- Epson's Apple scanner driver

Interface kit is required (Sold separately)

*Than the Epson ES-300C

SPECIAL OF THE MONTH

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EPL-7500 POSTSCRIPT™ LASER PRINTER

Incredible PostScript Price

The powerful EPL-7500, PC World's "Best Buy" and Info World's #1 PostScript laser printer!

- 6 pages per minute
- Adobe® PostScript with 35 typefaces
- Weitek XL-8200 series RISC processor
- 2MB memory, expandable to 6MB
- Parallel, serial, and AppleTalk® interfaces
- HP LaserJet Series II emulation
- 250 sheets input capacity

NEW LOW PRICE $799
B1-EPL7500

NEC Silentwriter® Model 95 — $1359

- 6 PPM PostScript® Level 2 and PCL 5
- AppleTalk/Parallel/Serial
- Automatic Emulation Switching
- 250 Sheets and built-in 15 envelope feeder

B1-NEC95 SRP $1749

NEC Silentwriter Model 95fx — $1849

NEW!

Same as above with built-in plain paper send/receive fax capability. *B1-NEC95FX*

NEC Intersect™ CD/ROM CDR-37 — $439

- Fast 450ms access time
- 150 KB/second data transfer rate
- 64 KB cache memory
- Optional battery pack for portable operation
- 2 year manufacturer's warranty
- Includes MAC interface kit

D1-CDR-37 & CD-MA002

NEC Intersect™ CD/ROM CDR-74 with MultiSpin™ — $619

- **280ms - Fastest Access Time Available**
- 300 KB/second data transfer rate
- 64 KB cache memory
- Standard dust brush for added dust protection
- Includes MAC interface kit
- 2 year manufacturer's warranty

D1-CDR-74 & CD-MA002

MAC CD/ROM SOFTWARE TITLES

Desert Storm *CDM-DESERT*	$29*	$39
Family Doctor *CD-DOCTOR*	$45*	$55
Interactive Storytime Vol. 1 *CDM-INSTORY*	$29*	$49
Orient *CDM-ORIENT*	$29*	$49
Sherlock Holmes *CDM-SHER*	$29*	$49
Toolworks Multimedia Enc. *CDM-ENC*	$49*	$239
Total Baseball *CD-TBASE*	$49*	$55
U.S. Atlas V 2.11 *CDM-ATLAS*	$29*	$39
U.S. History *CDM-USHIST*	$29*	$229
World Atlas V 2.1 *CDM-WORLD*	$25*	$49

*When purchased with CD-ROM drive shown above

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- AppleTalk®, Rasterport interface
- 39 Adobe® Type 1 scalable fonts
- 200 sht. paper cass.

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- AppleTalk®, Rasterport interface
- 39 Adobe® Type 1 scalable fonts
- Up to 10 ppm

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- RISC-based Processor
- 300 dpi • 2MB • 9 PPM
- 35 resident typefaces
- LocalTalk/RS-422, Centronics parallel, RS-232-C serial & SCSI interface — $1399

B1-LZR960-001

LZR 1560 Ledger/A3 Laser Printer — $2999

- 11 x 17" Imaging • Max. 400 dpi res.
- PostScript® Level 2 from Adobe® • 4MB
- 35 resident typefaces • Max 15 PPM

Both printers require MAC cable. Call for price.
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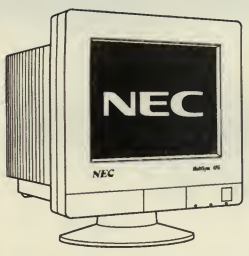

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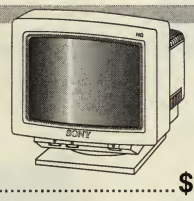

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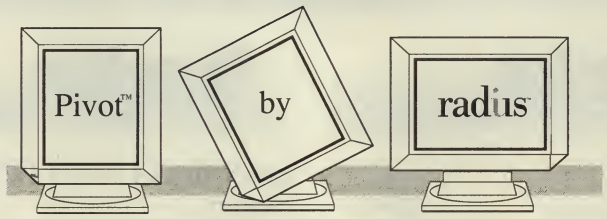

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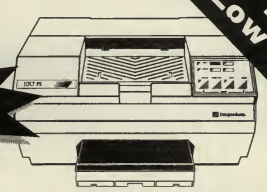

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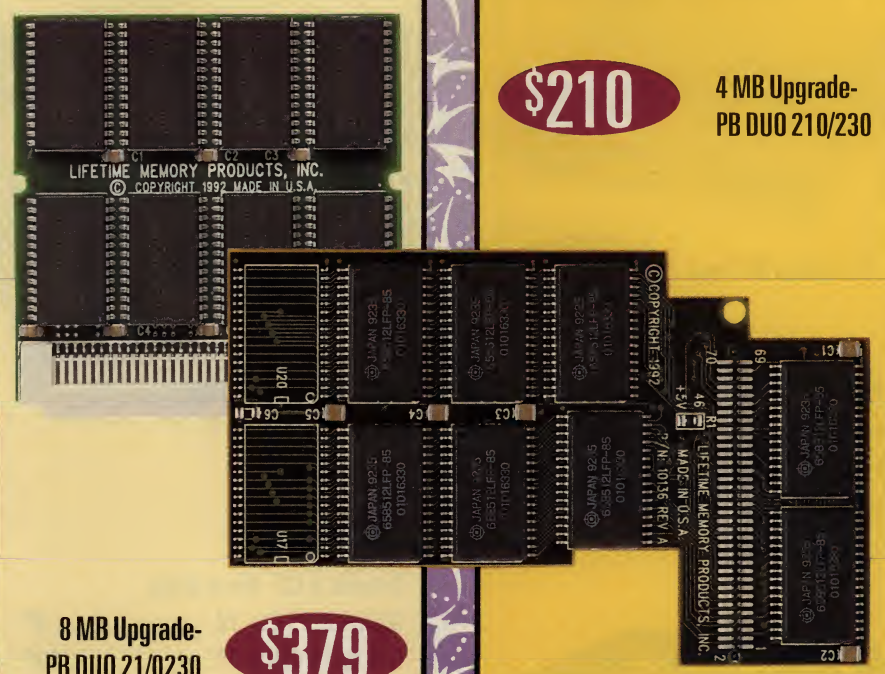

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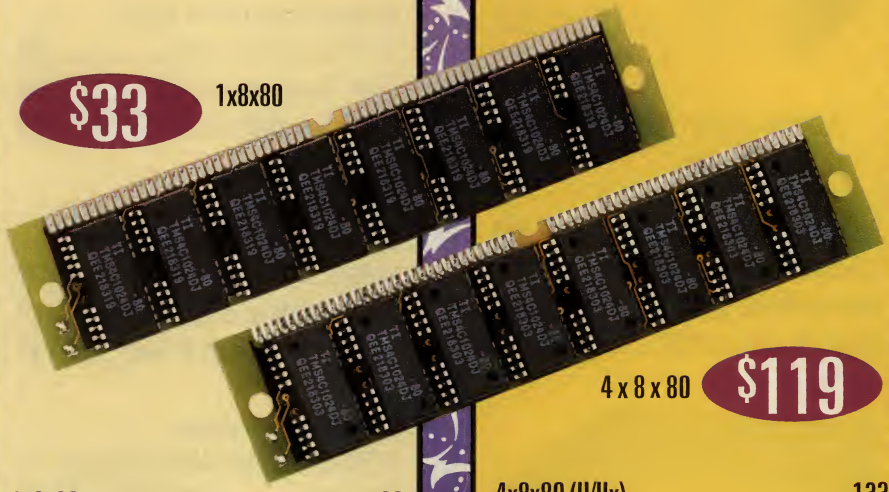

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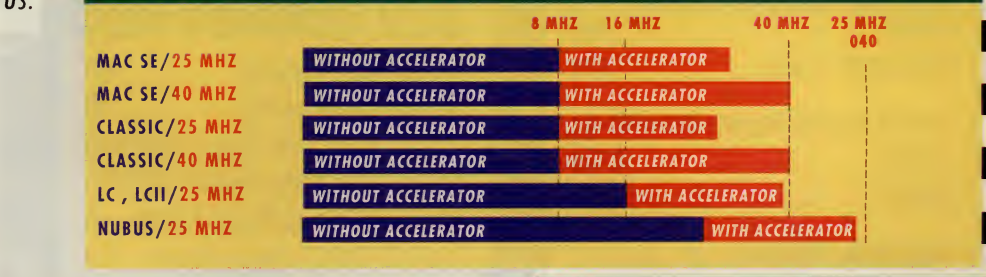

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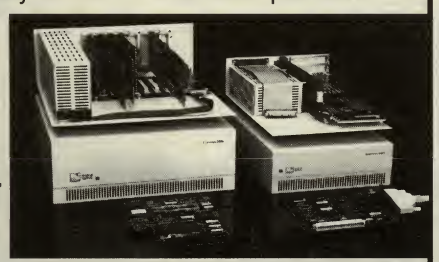

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Upgrade Tip of the Week

SNEAK PREVIEW

Take a look at the April issue of ***MacUser*** Magazine when it hits your mailbox.

This issue includes a comprehensive review on accelerators and the **MicroMac MultiSpeed** accelerator was selected as a ***MacUser*** "Bottom Line" pick.

In the 25MHz class, the MicroMac MultiSpeed fell right in the middle with respect to speed increase, however, the MicroMac MultiSpeed offers the ***best performance for the price by far***.

"The faster the speed the CPU accelerator provides, the higher the price, right? Not always. We did find that faster costs more, but we also uncovered some accelerators that, although they didn't produce the greatest speed gains, offered a lower price for their respective speed increases. For example, the MicroMac MultiSpeed, a 25-megahertz accelerator for the SE [also available for the Plus], can increase the SE's speed fivefold for a mere $300 – several cards that provide a bigger speed increase are available, but none are as inexpensive.

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32MHz 68030 $398!

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- ✔ Four SIMM slots for ultra-fast 32-bit memory
- ✔ Up to 16MB of physical or virtual memory with optional Connectix Virtual 3.0 software
- ✔ 68882 Math co-processor socket
- ✔ Installs in PLUS with optional adapter board

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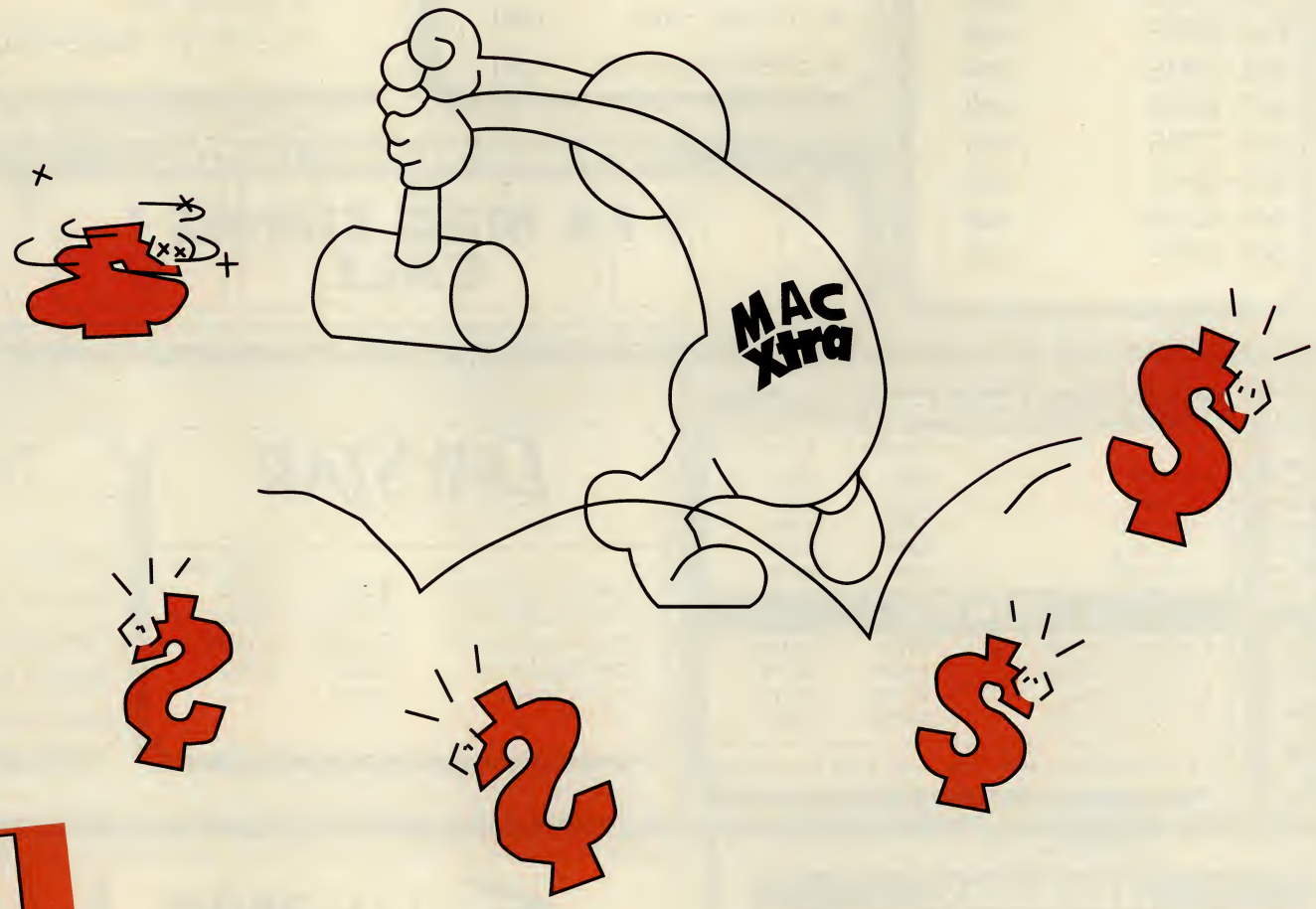

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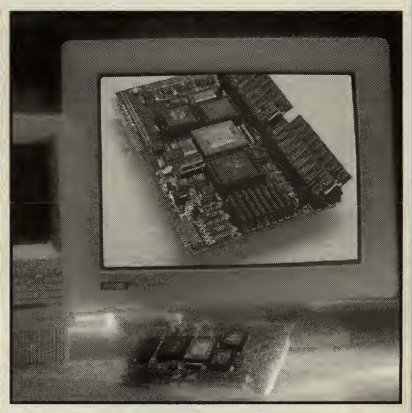

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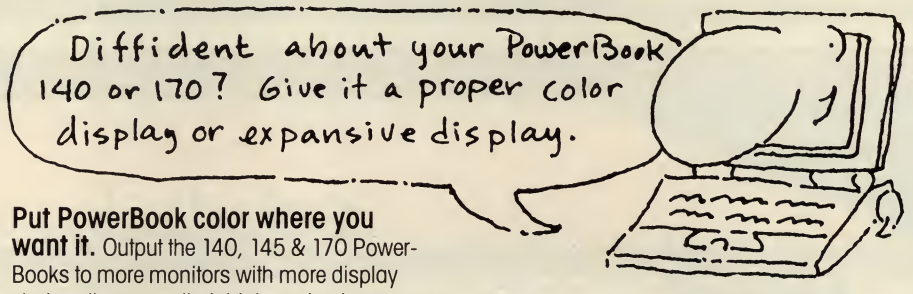

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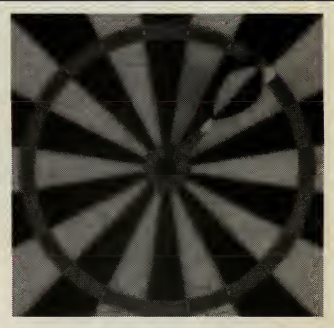

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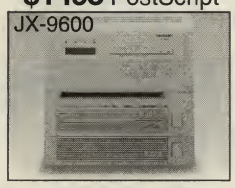

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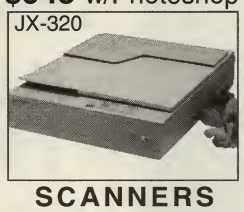

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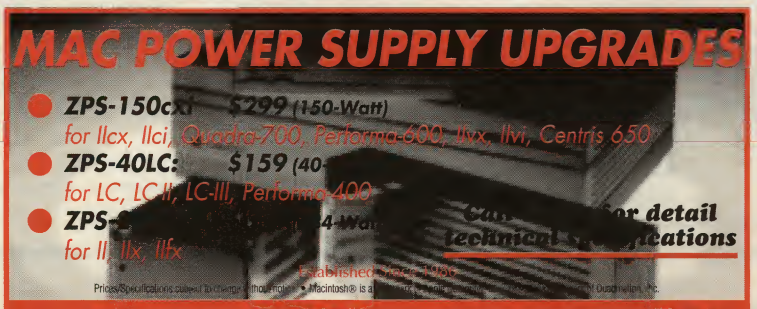

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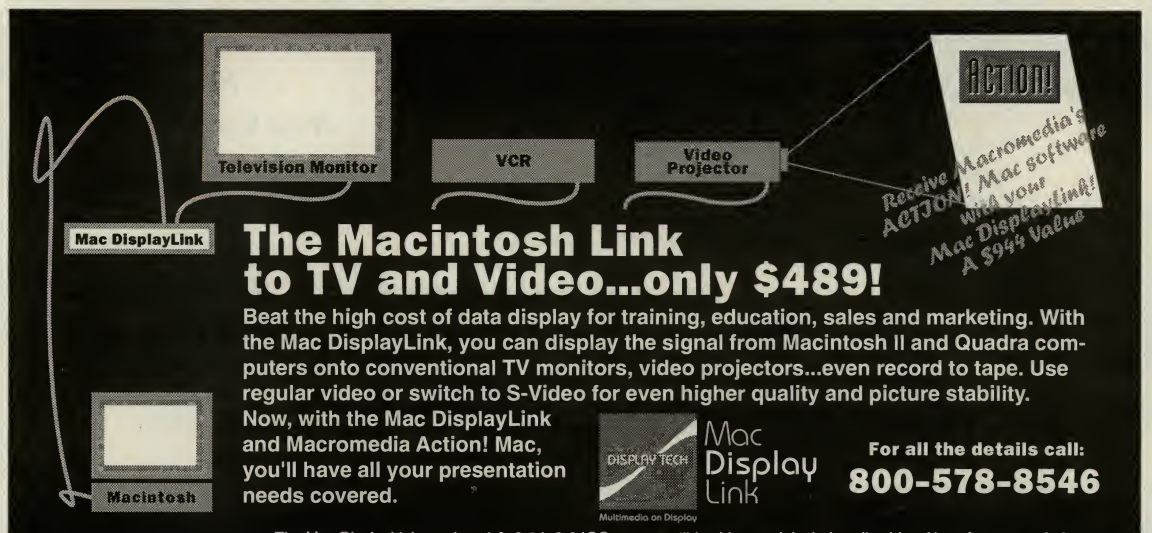

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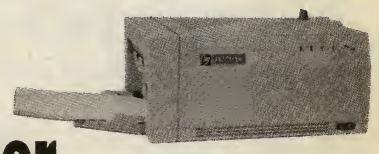

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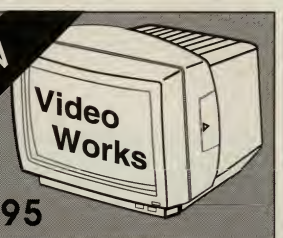

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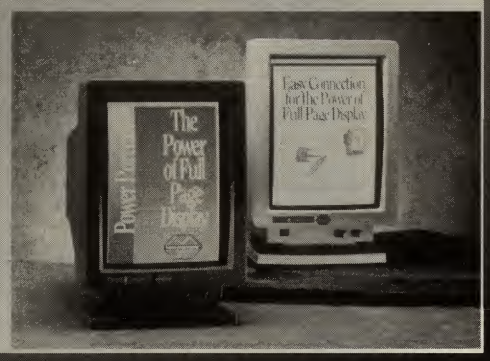

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1.2GB	PO-12S	5.25 FH	13	$1425	$1525
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• 3.5" drives have one year warranty					
• 5.25" drives have two year warranty					
SEAGATE					
1.2GB	ST11200N	3.5 HH	10.5	$1545	$1605
2.1GB	ST42100N	5.25 FH	12.9	$1945	$2045
1.6GB	ST41600N	5.25 FH	11.5	$1999	$2099
2.4GB	ST42400N	5.25 FH	11	$2879	$2979
3.4GB	ST43400N	5.25 FH	11	$3929	$4029
• Drives have one year warranty					
MICROPOLIS					
660MB	1624	5.25 HH	14.5	$1269	$1395
1.0GB	2112	3.5 HH	10	$1689	$1749
2.0	1924	5.25 FH	10	$2849	$2949
• Drives have five year warranty					

Call for latest pricing.
MAC MEMORY

DAYSTAR DIGITAL ASANTÉ

IMS Hard Drives ship with SCSI Specialist formatting software and all necessary cabling. No surcharge for Visa/Mastercard. Prices and product availability subject to change without notice. Not responsible for typographical errors. Apple, the Apple logo, and Macintosh are registered trademarks of Apple Computer, Inc. All brand names and product names are trademarks or registered trademarks of their respective owners.

Relax...you're in good company. Since 1978 510-471-6112

From the beginning, Relax's relationship with corporate customers has been strong.

❖

As a matter-of-fact, over 50% of our sales are from repeat customers.

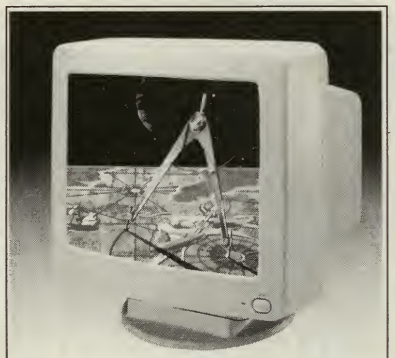
❖

Our customers must be satisfied since the majority of our new customers are from referrals.

❖

We must be doing something right.

RELAX TECHNOLOGY®



20 Inch Trinitron Color! $1,599 Monitor Only

Trinitron Monitor Only	1,599
Business Package* - 256 Color	1,799
Artist Package* - 16 Million Color	2,449

* Package includes a new 20" Captronics CDS-8920 Mac compatible Trinitron color monitor, video board, and cable. 72 dpi for WYSIWYG. 1024 x 768.

Video Monitors & Packages

RASTEROPS®

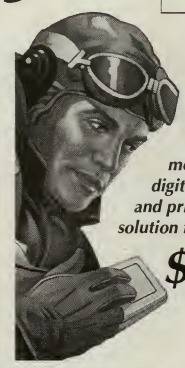
Custom Color 20" System
24-Bit Color - 20" Trinitron Monitor
$4,199*

ProColor 32	3,149
24XLi	1,859
PaintBoard 24	1,459
PaintBoard Li	849
8XL	479
24STV - Multi Media	799
MoviePak	1,549
24XLTV Multi Media	2,749
24MxTV Multi Media	1,649
MediaTime Multi M.	1,599
ClearVue/Classic	299
ClearVue/LC	299

* Include $200 back direct from RasterOps. Offer expires 3/31/93.

14 Inch 256 Color Monitor! $359
Complete 8-Bit Package - $499

Compatible with Macintosh On-Board Video: LC, LCII, si, ci and Quadra 900/950



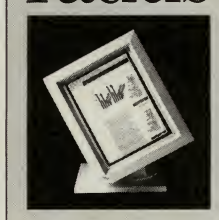
MoviePak
Adobe Premiere Special!
MoviePak works with all RasterOps multi-media display adapters to give you full-motion digital video recording, and full-scree playback and print-to-tape capabilities, all in a single-slot solution for any size Macintosh.
$1,549 RASTEROPS®
For a limited time, MoviePak includes Adobe Premiere free - a $695 value!

20 Inch Hitachi 256 Color Monitor! $799 Monitor Only

20" Hitachi Monitor Only	799
Business Package* - 256 Color	999
Artist Package* - 16 Million Color	1,649

* Package includes a new 20" Hitachi Mac compatible color monitor, video board, and cable. 72 dpi for WYSIWYG. 1024 x 768.
Your satisfaction is guaranteed or your money back!

radius

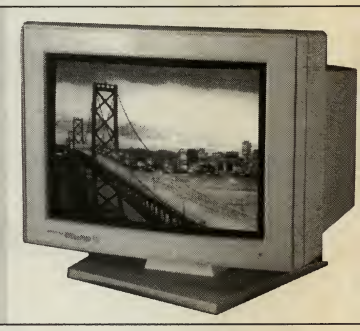


Monochrome Pivot Monitor	745	
PrecisionColor Pivot 15"	949	Multifrequency. Mac on-board compatible.
19" Monochrome Monitor	899	
PrecisionColor Display/19	1,999	Hitachi tube - multifrequency.
PrecisionColor Display/20	2,299	Sony Trinitron tube - multifrequency.
Color Display/21	2,999	Two-page display. Hita chi tube - 1,152 x 870.
Mono Pivot Video Board	249	
Color Pivot Video Board	499	
PrecisionColor 8XJ	489	256 colors (8-bits) at maximum resolution (1,152 x 882), 4 display resolutions, accelerated.
PrecisionColor 8X	739	256 colors (8-bits) at maximum resolution (1,152 x 882), 4 display resolutions, accelerated.
PrecisionColor 24XP	489	16 million colors (24-bits) at maximum resolution (832 x 624), 2 display resolutions, accelerated.
PrecisionColor 24XK	819	16 million colors (24-bits) at maximum resolution (1,024 x 768), 3 display resolutions, accelerated.
PrecisionColor 24X	1,629	16 million colors (24-bits) at maximum resolution (1,152 x 882), 4 resolutions, non-accelerated.
PowerView (PowerBook)	489	
VideoVision	1,949	16 million colors (24-bits) at maximum resolution (640 x 480), 4 display resolutions, non-accelerated, video capture up to 30 frames/sec.
PrecisionColor Software	249	
Radius Rocket 33	1,949	
Radius RocketShare	399	
Radius SCSI-2 Booster	249	

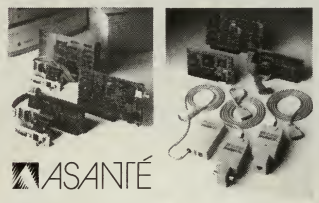
20 Inch Sampo OfficePro IIa 256 Grayscale! $599 Monitor Only

Monitor Only	599
Mac II, x, fx, cx, ci Package*	799
Mac LC, LCII, SE/30 Package*	999

* Package includes a new 20" Sampo OfficePro IIa Mac compatible grayscale monitor, video board, and cable. 72 dpi for WYSIWYG. 1024 x 768.
Your satisfaction is guaranteed or your money back!



Ethernet/Network



ASANTÉ

Asanté MacCon3 - 64K	199	The 3-in-1 (Thick, Thin and 10BaseT) Ethernet card for most expandable Macintoshes including the IIsi and SE/30. Not available for the LC or LCII.
Asanté MacCon+ - 64K	159	Economical, 64K high-performance Ethernet for almost every model of Macintosh. Select either Thick/Thin or Thick/10BaseT. The Asanté MacCon+ models for the LC, LCII and IIsi each have a socket for a co-processor.
Asanté FriendlyNet Adapters	79	Designed to work with the new Apple Ethernet cabling system - a plug-and-play networking system which makes Ethernet as simple and easy as LocalTalk.
Asanté 10BaseT Hub/8	239	An economical way to expand your Ethernet network using unshielded twisted pair wiring (10BaseT).
Asanté 10BaseT Hub/12	479	A more sophisticated and larger version of the Asanté 8-port Hub. The most economical way to expand your Ethernet network using unshielded twisted pair (UTP, 10BaseT). Fully supports IEEE specifications..
AsantéHub 1012	1,379	A 12-port, intelligent 10BaseT hub. Built-in expansion slot for internet-working option cards (optional SNMP in-band module). Multiple hubs can be interconnected via BNC, RJ45 and AUI. Works with AsantéView software (optional) for control directly or remotely.
Asanté Print	349	An inexpensive Ethernet-to-LocalTalk converter that easily connects one or two LocalTalk peripherals to an Ethernet network. With no switches to set or installation software to load, it is smart enough to work right out of the box. Thick/Thin or Thick/10BaseT.
TechWorks Ethernet Cards	99	We made a special purchase of TechWorks Ethernet NuBus cards and are offering them on a first-come-first-served basis. Limited to supply on-hand.
Tribe LocalSwitch	1,499	LocalSwitch is a 16-port intelligent packet-switching hub for Macintosh networks. Using standard LocalTalk protocol and twisted pair wiring, LocalSwitch processes many network transmissions simultaneously.

$1,499 Tribe LocalSwitch

Modems

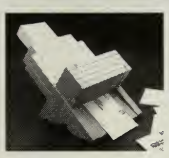
SupraFAX Modem Plus 2,400 ... 199
2,400 bps Modem/9,600 send-receive FAX. v.42bis data compression for up to 9,600 bps data.

SupraFAX Modem v.32bis 14,400 ... 349
14,400 bps Modem/14,400 send-receive FAX. v.42bis compression for up to 57,600 bps data.
All SupraFAX modems include STF and MicroPhone software, cable and have a 5-year Warranty

Quicktel 2400/9600 FAX/Modem ... 139
2,400 bps Modem/9,600 send-receive FAX. v.42bis compression for up to 9,600 bps data. Incl. software.

Quicktel v.32bis 14,400 ... 299
14,400 bps Modem/14,400 send-receive FAX. v.42bis compression for up to 57,600 bps data.

CoStar Printers



$439 AddressWriter personal envelope and label printer

AddressWriter Printer ... 439
144 x 144 impact dot-matrix print head. Optional label feeder will handle a variety of pin-fed labels for added convenience and value. Specify voltage.

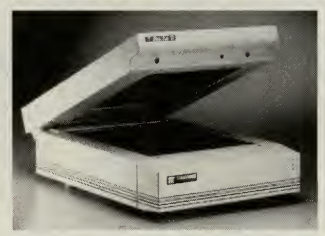
LabelWriter II & LabelWriter II Plus personal label printers
$179 COSTAR

The LabelWriter II and II Plus use direct thermal input technology to produce high-quality labels in a variety of sizes. The LabelWriter can be attached directly to your computer or AppleTalk Network.

LabelWriter II Mac ... 179
Handles up to 350 labels per roll. Maximum label size: 1-1/8" x 3-1/2". Prints one label in 3-1/2 secs.

LabelWriter II Plus Mac ... 249
Handles up to 700 labels per roll. Maximum label size: 2-1/4" x 4". Prints one label in 3-1/2 to 7 secs.

300/600/800/1,200 dpi Color & Grayscale Scanners



Tamarack 600 dpi Color Scanner $979 and Slide Attachment $549

Tamarack 600 Color Scanner:
24-Bit Color - 8.5" x 11.5" ... 979
Slide Attachment (shown) ... 549
PhotoShop LE (limited version)* ... 99
PhotoShop 2.0 (full version)* ... 199

Relax Color: (Epson Engine)
24-Bit Color Scanner - 8.5" x 11.5"
300 dpi - 110 VAC ... 999
300 dpi - 220 VAC ... 1,099
Color Studio LE (limited version)* ... 79
Color Studio 1.5 (full version)* ... 159

Umax Color Scanners:
UC630** - 8.5" x 14"
24-Bit 600 dpi w/PhotoShop ... 1,079
Transparency/Slide Attachment . 789
Auto Document Feeder ... 479
UC1200S** - 8.5" x 14"
24-Bit 1,200 dpi w/PhotoShop 2,999
Transparency/Slide Attachment . 889

Relisys Color Scanner:
ColdScan 800 - 8.5" x 14"
24-Bit 800 dpi ... 1,099
PhotoShop LE (limited version)* ... 99
PhotoShop 2.0 (full version)* ... 199
* with purchase of scanner, ** includes PhotoShop

SHARP® JX-320 $999
16 Million Color - 300/600 dpi
An affordable, quality, flatbed 8-1/2" x 11", 24-bi color scanner for business and professional use.
Sharp's patented one-pass system ensures quality color while reducing scan times. 600 DPI using Sharp's proprietary software. By strobing three colored fluorescent bulbs through filters the Shar system ensures optimal color accuracy and eliminates misregistration for clearer reproductio
The Sharp JX-320 is the first color scanner fully compliant with the new SCSI-2 standard which eliminates the need for special drivers .
Includes the full version of PhotoShop. OCR compatible. Built-in command set includes: downloadable Gamma Tables; Edge Emphasis; Brightness; and, Lightness. 110 VAC only.
Sharp JX-320 Color Scanner ... 99
Transparancy Option JX-32F3 ... 79

SHARP® $1,499

600 dpi Engine
• 8 ppm • Mac & IBM Compatible
• RISC Processor • PostScript
AppleTalk on-board. Scalable typefaces - PostScript and PCL5 for thousands of fonts. Printer emulations include Hewlett Packard, IBM ProPrinter & Epson. Parallel and serial interface with automatic sensing - Mac's and IBM's can be on-line at the same time! 2 MB RAM (expandable to 8MB).

Check us out! We keep our customers happy by offering them what they want...

Quality and selection. We offer a wider choice of award-winning products. More choices makes for wiser selections.

30 day money back guarantee. You must be satisfied or we want you to return the product. We count on word-of-mouth advertising. An unhappy customer doesn't work for us.

Service and security. Since 1978 Relax's commitment to customer satisfaction, has meant quality products and service. Winner of ***MacWorld Magazine's Service Hero Award,*** our sales and service team treats service very seriously

If you need help, our ***Express Service Program (ESP)*** will have you up and running in less than 48 hours - guaranteed! We even follow-up on service calls to insure that you get the help you need and that we are attaining our customer satisfaction goal.

Cost Savings. We save you money on the products you want, and we'll be there to service you tomorrow. After all, how good is a "deal" if the company goes broke?

Knowledgeable sales staff. We take pride in our courteous and knowledgeable sales staff. Sales and technical support goes hand-in-hand with the wide selection we offer. Each sales rep is also a product manager, so expert technical assistance isn't far away.

SyQuest Removable Drives

FEATURING
SyQuest®
REMOVABLE
TECHNOLOGY

$389	$489	$589
Mobile 44	Mobile 88	Mobile 88+
SQ555	SQ5110	SQ5110C

Cartridge	1 to 4	5 to 9	10 +
44 Meg.	63	61	Call
88 Meg.	98	95	Call

New! Mobile 88+ reads and writes both 44 and 88 Meg. cartridges!

Bernoulli Mac 90

IOMEGA

$499

Iomega has enjoyed an excellent reputation for years as the provider of high quality removabble storage for IBM computers.

Now they have brought their years of experience to the Macintosh.

90 megabytes of storage in each data cartridge. Includes software and cables.

5-year warranty on all data cartridges!

Cartridges - $169

DAT, ExaByte & Teac Tape Drives & Media

Tape Drives include media, software and cables!

Tape Drives:

160 Meg. Tape Vista - TEAC 449
250 Meg. Tape Vista - Archive 599
600 Meg. Tape Vista - TEAC 699

DAT & ExaByte Drives Include Retrospect Software!

DAT 4 mm Drives:

2.0 Gig. DAT Sierra - Archive 1,199
2.0 Gig. DAT Sierra - ExaByte DAT . 1,299
2.0 Gig. DAT - Hewlett Packard 1,399

Compression DAT 4 mm Drives:

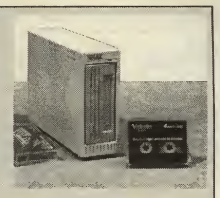
8.0 Gig. DAT Sierra - Archive 1,399
8.0 Gig. DAT Sierra - ExaByte DAT . 1,499
8.0 Gig. DAT - Hewlett Packard 1,599

ExaByte Helical Scan 8 mm Drives:

2.2 Gig. Tape Vista - ExaByte 8200 . 1,799
5.0 Gig. Tape Vista - ExaByte 8500 . 2,799

8.0 Gig. DAT Tape

Retrospect software & tape included!



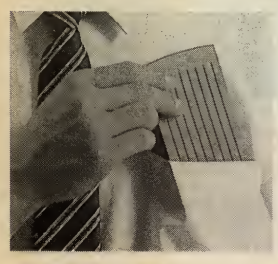
$1,199 ARCHIVE®

Relax 600 Meg. Tape 699

Selected for performance, value and service. Quality at low cost. Perfect for backing up hard disks up to 600 megabytes. Complete package includes software, cables and media. MACWORLD - 12/92.

MACWORLD MW EDITORS' CHOICE

Introducing FreeLance™



Desktop performance that fits in your pocket!

Our powerful 80MB, 120MB and 160MB FreeLance drives are designed for the Apple PowerBook computers - we even use the same quality drives Apple uses! Light (less than 10 ounces) and fast (17 ms seek time). The FreeLance feature quiet and reliable Quantum Go•Drives for added value. Our FreeLance Value Pack includes everything you need to work with the PowerBook including a power supply and SCSI cable for the Macintosh. The FreeLance Dock™ adds battery power and charger for convenience and extended use on-the-go.

FreeLance Drives:

80 Meg. FreeLance Go•Drive 429
120 Meg. FreeLance Go•Drive 559
160 Meg. FreeLance Go•Drive ..... Call

Includes your choice of 110V or 220V power supplies and a PowerBook or standard Macintosh SCSI cable.

FreeLance Dock, Battery & Charger 229

This is a complete package, including your choice of 110V or 220V charger, a PowerBook 140-180 compatible battery, transportable power cable and SCSI cable. Use the FreeLance Dock on-the-go or in the office. The battery is interchangable with the PowerBook's. You can even fully recharge your PowerBook's battery in just 45 minutes while you're working.

FreeLance Options:

PowerBook Battery - 140-180 49
SCSI Cable - DB25M/DB25M 19
SCSI Cable - DB25M/Cent50M 19
Adapter - DB25M/HDI30 19

Premium Hard Disk Drives - Macintosh

Seagate 3-1/2" Half Height

	Internal	External
108 Meg. - ST1133N, 15 ms.	239	299
510 Meg. - ST1581N, 14 ms.	939	999
1.0 Gig. - ST11200N, 14 ms.	1,499	1,559
5-1/4" Full Height - WREN		
1.0 Gig. - ST41200N, 15 ms.	1,239	1,299
1.4 Gig. - ST41651N, 15 ms.	1,739	1,799
1.9 Gig. - ST42100N, 12.9 ms.	1,839	1,899
5-1/4" Full Height - ELITE Ultra-High Performance		
1.4 Gig. - ELITE-I, 11.5 ms.	1,839	1,899
2.1 Gig. - ELITE-II, 11 ms.	2,539	2,599
3.5 Gig. - ELITE-III, 11 ms.	3,439	3,499

Fujitsu 3-1/2" Half Height

520 Meg. - 2624FA, 9 ms.	939	999
5-1/4" Full Height		
1.2 Gig. - 2266SA, 11.5 ms	1,539	1,599
2.0 Gig. - 2652SA, 11.5 ms	2,439	2,499

Maxtor 3-1/2" Low Profile/Low Power

120 Meg. - 7120S, 15 ms.	279	339
213 Meg. - 7213S, 15 ms.	399	459
5-1/4" Full Height		
645 Meg. - XT8760, 16.5 ms.	1,299	1,359
1.7 Gig. - Panther, 13 ms.	1,799	1,859

Quantum 3-1/2" ELS Low Profile

42 Meg. - ELS42, 19 ms.	189	249
85 Meg. - ELS85, 17 ms.	239	299
127 Meg. - ELS127, 17 ms.	299	359
2-1/2" - Internal for the Mac PowerBook only		
80 Meg. - Go•80, 17 ms.	329	429
120 Meg. - Go•120, 17 ms.	459	559
3-1/2" PDS, PRO & LPS Series		
240 Meg. - LPS240, 10 ms.	499	559
525 meg. - LPS525, 10 ms.	939	999
1.0 Gig. - PD1050S, 11 ms.	1,439	1,499
1.2 Gig. - PD1225S, 11 ms.	1,699	1,759

Conner 3-1/2" Half Height

	Internal	External
42 Meg. - CP-3040, 25 ms.	179	239
85 Meg. - CP-30080E, 17 ms.	239	299
120 Meg. - CP30100, 19 ms.	279	339
170 Meg. - CP-30170E, 17 ms.	339	399
212 Meg. - CP-30200, 12 ms.	399	459
545 Meg. - CP-30540, 8.5 ms.	999	1,059

Hewlett Packard 3-1/2" Half Height

422 Meg. - HP2235, 12.6 ms.	1,139	1,199
1.2 Gig. - HP2247, 12.6 ms.	1,739	1,799
5-1/4" Full Height		
1.2 Gig. - HP97558, 13.5 ms.	1,639	1,699
1.6 Gig. - HP97560, 13.5 ms.	2,199	2,259

Special Purchase

$1,239

15 ms. average access.
External Model $1,299

1.0 Gig. Hard Disk

Seagate

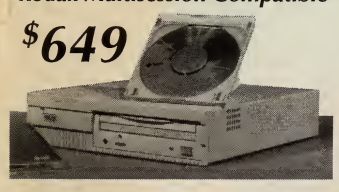
Nobody knows more about performance hard disk drives than Seagate! This is an exceptional value for a fast and dependable top-of-the-line model. Compare. For a limited time, we are offering a Gigabyte hard drive for what others charge for their 500 megabyte model! Available only while quantities last!

Save $100. Model ST41200NM.

Macintosh CD-ROM Players

Kodak Multisession Compatible

$649



Toshiba CD-ROM - XM3401B 649

Featuring the **Multisession Toshiba XM3401B**. Vista CD-ROM provides state-of-the-art performance including a sealed contamination free environment and an automatic lens cleaning mechanism which dramatically improves reliability. **Fast 200 milliseconds average access.** Full audio control via software is provided by the **Music Box** software. Includes sample CD.

Texel Multisession CD-ROM 549

Featuring the **Texel DM3024**. This is a performance drive with 235 ms average access and double the normal speed - 300 KBytes/sec. data transfer. Kodax compatible!

$299

Portable Player

NEC

CD-ROM - Mesa Portable 299

New! Manufacturered for Relax by NEC, the **Mesa** is a fast, portable and fully functional CD-ROM player for music and data. Call for details about this bargain performer.

Rewritable Optical Drives

$1,499
600 Meg.
ISO Optical

- Industry Standard - ISO Certified
- Macintosh - IBM Compatible
- Low Cost - High Performance

Large, fast and affordable. We offer a variety of solutions for your large capacity data storage needs.

600 Meg. Optimem ISO Model 750 . 1,599
Premium Quality at Low Cost - 60 ms. access.
While Supplies Last - Limited Quantity!

600 Meg. Ricoh ISO 5030E-II 1,499
Factory reconditioned. Full warranty. 67 ms. access.

600 Meg. Ricoh ISO 5031E New! ... 2,599
High performance - 35 ms. average access.

1.0 Gig. Maxoptix Tahiti-II 3,499
High capacity - 1 Gigabyte - 35 ms. average access.

600 Meg. Pioneer MultiFunction 2,199
Rewritable and WORM in one unit.

600 Meg. Pioneer WORM 1,799
Premium quality, best selling WORM

Media:	1 to 4	5 +
128M 3-1/2" Optical	39	35
600M 5-1/4" Optical Plastic	99	95
600M 5-1/4" Optical P 5-Pk	475	460
600M 5-1/4" Optical Glass	169	159
1.0G Glass, Maxoptix	239	229
600M Multifunction	179	169
600M WORM, Pioneer	109	99

128 Meg. Optical
Macintosh & IBM compatible
$999

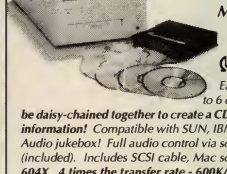
Each 3-1/2" erasable optical cartridge holds over 120 megabytes of data! The **Sierra MO** (shown) is an ideal primary or backup storage device for IBM or Macintosh personal computers. Featuring the Panasonic, RICOH or EPSON drive, the **Sierra MO** is IBM and SONY compatible - and it is faster! Complete package - includes SCSI cable, On Location software, and power supply.

Includes media, software & cables!

128 Meg. Ricoh ISO 1,099
128 Meg. Epson ISO 1,049
128 Meg. LMSI - Panasonic ... 999

Verbatim®

Verbatim Media:	1 to 4	5 +
128 Meg. 3-1/2" Optical	49	45
128 Meg. 3-1/2" 5-Pk	235	195
600 Meg. 5-1/4" Plastic	109	105
600 Meg. 5-1/4" P 5-Pk	495	475



6-Disc CD-ROM Mini-Changer
More than 3 Gig of Data On-Line!

PIONEER $949

Each compact, easy-loading magazine holds up to 6 different discs. **Additional Mini-Changers can be daisy-chained together to create a CD-ROM library of over 20 Gigabytes of on-line information!** Compatible with SUN, IBM and Macintosh. Can even be used as a CD-Audio jukebox! Full audio control via software is provided by the **Music Box** software (included). Includes SCSI cable, Mac software, and sample CD-ROM. **New - DRM-604X. 4 times the transfer rate - 600K/Sec.**

DRM-600A 6-Disc .... 949 DRM-604X 6-Disc . 1,499

SIMMS - Video Memory - Accelerators

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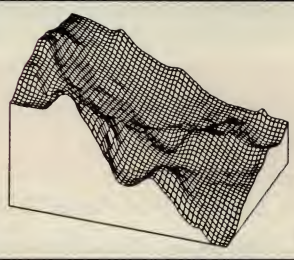

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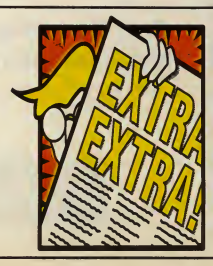

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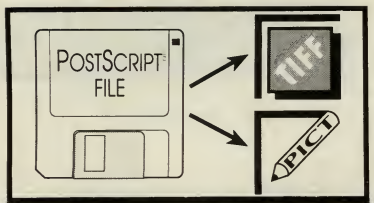

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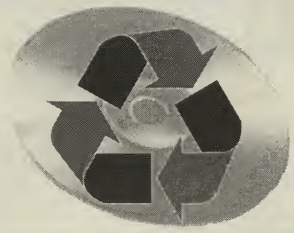

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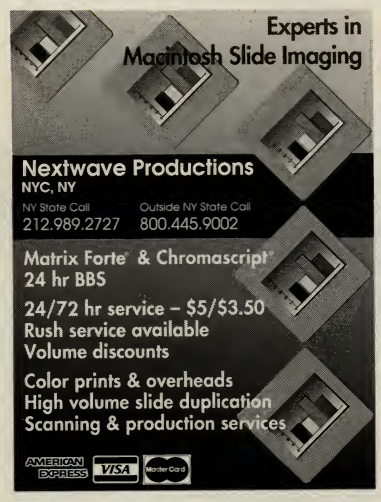

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Server

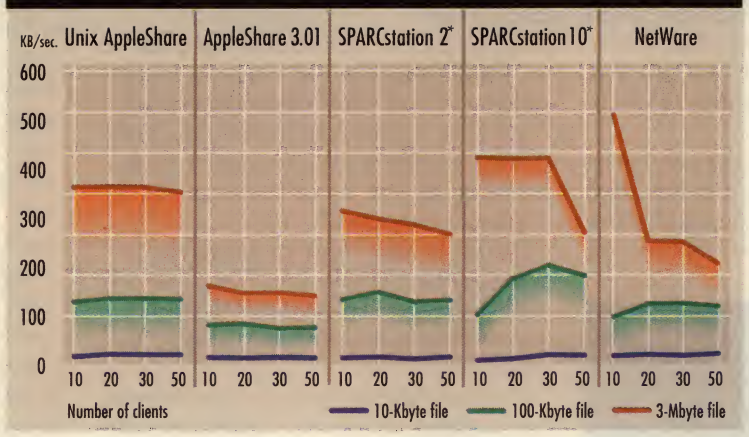
From Page 1

taneously than with 10.

The report also compares the Quadra 950-based system with several competing server solutions: a Compaq Computer Corp. system with a 50-MHz 486 running Novell Inc.'s NetWare and NetWare for Macintosh software and SPARCstation 2 and SPARCstation 10 Unix systems from Sun Microsystems Inc. running AFP (AppleTalk Filing Protocol)-compatible server software. The results show that the Apple product matched or outperformed the NetWare and Sun systems in most areas, although the SPARCstation 10 proved slightly faster at reading and writing large files (see charts, Page 1 and this page).

"When additional factors, such as ease of use and cost of ownership are taken into consideration, we feel the case for the new Apple server is close to unbeatable for all but the very largest and most data-intensive networks," the report states.

Unix AppleShare smooth in writing data



** Running Unix-based AppleTalk Filing Protocol-compatible server software.*

Apple is expected to offer the server PDS card in a bundle with A/UX and AppleShare Pro to current Quadra 900 and 950 users.

▶ **Workgroup Server 80.** Intended for medium-size workgroups, the Quadra 800-based bundle will include AppleShare 4.0, a new version of Apple's System 7-based file and print server software. The Quadra 800 package will not include the PDS server card, which will not be necessary in AppleShare 4.0 servers.

▶ **Workgroup Server 60.** AppleShare 4.0 will also ship in a bundle with a Centris 610. Apple reportedly told analysts last week that the Workgroup Server 60 is designed for workgroups of fewer than 20 users.

Pricing for the new server systems was not available. □

Leonard Heymann contributed to this report.

Printers

From Page 1

▶ **QSP.** QuickDraw Streaming Protocol will speed the transfer of QuickDraw code to an output device via a fast new serial port.

▶ **High-performance port.** QSP will take advantage of Apple's new high-performance serial port, scheduled to make its debut on the forthcoming digital signal processor-equipped Macs, code-named Cyclone and Tempest (see MacWEEK, May 25, 1992, and Feb. 22). The new port reportedly will be able to handle several standards, including ISDN (Integrated Services Digital Network), LocalTalk and an Apple proprietary 19.2-Kbps modem protocol.

New Apple printers reportedly will include a port that can act as a standard or high-speed serial interface; they also will include at least a 1-Mbyte memory buffer. For most jobs, sources said, printing QuickDraw GX files using QSP and the new port will be six to eight times faster than standard PostScript output with conventional networked printers.

Apple reportedly will deliver several new output devices that provide the QuickDraw GX page-description language and eliminate the added cost of licensing PostScript. A 600-dpi version of the company's 5-page-per-minute LaserWriter Select 300 personal laser printer is expected to ship in a QuickDraw configuration for less than $1,500.

Apple also plans to deliver a QuickDraw-based personal laser printer built around a 4-ppm, 300-dpi Canon engine for as little as $700. Hewlett-Packard Co., based in Palo Alto, Calif., reportedly will ship the same engine in a PCL 5-only configuration for a comparable price.

HP is eager to license the new QuickDraw GX technology from Apple, its long-standing rival in the Mac printer market, according to sources. HP declined to comment on the reports.

QuickDraw GX, due later this year, will include a "smart" font format that lets fonts accommodate up to 65,000 different characters. It will support unlimited numbers of style variations, kerning tables, and contextual substitution tables for ligatures and fractions. QuickDraw GX will have line-layout functions that will let users distort editable text as a graphic.

In addition to TrueType fonts, PostScript Type 1 and multiple-master fonts will be able to take advantage of these effects if they are programmed to support the QuickDraw GX font data structure.

Adobe Systems Inc. of Mountain View, Calif., is programming its Type 1 font collection to take advantage of QuickDraw GX, said Dan Mills, Adobe manager of typography. In fact, a QuickDraw GX-ready version of Adobe's Tekton font will be bundled with QuickDraw GX. "Type 1 and TrueType fonts will be treated as equal citizens under QuickDraw GX," Mills said.

According to Ajit Kapoor, president of Intelligent Solutions of Boston, "Apple's ultimate goal is to make [itself] totally independent from Adobe.

"It's safe to conjecture that Apple will continue to support PostScript while at the same time building a Mac-only environment," Kapoor said. "There's going to be interoperability among all printer languages. QuickDraw GX is no different from PostScript; it's just a matter of converting from one kind of silicon to the other." □

PIE

From Page 1

to a database, Cummings said. It will also be able to transmit data over its infrared link to another Newton. Although Apple won't offer its own desktop infrared receiver, it would be possible for a third party to build a Mac connector.

Apple will begin seeding customers with Newtons this month. A development environment that combines scripting with a forms maker will follow shortly after, Cummings said.

PIE is expected to make several significant announcements at the CeBIT '93 trade show in Hanover, Germany, later this month. The division will disclose that it has licensed Newton technology to other developers besides Sharp Electronics Corp., which is building the first device.

PIE also may show an 8-by-10-inch Newton slate prototype. The slate design is not expected to ship this year, sources said.

PIE also will introduce its first device, a $500 portable CD-ROM drive expected to ship in May. The dual-speed, multisession Photo CD drive is reportedly being built by Philips N.V. of the Netherlands, not by Sony Corp., which manufactures the dual-speed drives used in desktop Macs.

The portable drive will come with an infrared remote control and will offer NTSC and PAL (European) video-out for playing Photo CD images directly on a television. It also will be able to connect to a Mac through its SCSI port and will have stereo audio-out for playing audio CDs, sources said.

Later this year, PIE is expected to ship two more devices: a CD-ROM-based multimedia player that utilizes ScriptX, a multimedia scripting language under development at Kaleida Labs Inc., and a portable device for playing HyperCard stacks.

The ScriptX player, due this fall, will sport a 640-by-400-pixel LCD touchscreen with 100-dpi resolution, a PCMCIA slot, a SCSI interface, a serial port and an infrared receiver for an optional keyboard. The 3-pound PDA will reportedly run on four AA batteries.

The division will announce its strategy for publishing multimedia and Newton content this spring. According to sources, the company plans to offer a combination of titles licensed from other developers and titles created by Apple. □

Novell

From Page 1

for specific AppleTalk nodes.

New caching features will give Mac clients speedier access to CD-ROMs attached to NetWare servers, and a new data-migration option will move infrequently used files to slower backup media attached to the server, based on administrators' settings.

Since time stamping and static addressing will be available to NetWare for Macintosh 3.x users in an upgrade scheduled for this summer, some managers said they can afford to wait until Version 4.0 has proved stable before switching.

"If the question is 'Will we upgrade,' the answer is 'Yes, but not yet,' " said Martin Gutteridge, senior consultant at KPMG Peat Marwick in Hamilton, Bermuda. KPMG's mostly Mac sites around the United States use NetWare servers. "The size of our individual sites is not large enough to warrant 4.0 right away, but when we look at the future functionality, it's attractive."

In the long term, Novell, based in Provo, Utah, said it has two approaches to strengthening the ties between NetWare and the Mac. In one effort, the company will support new Apple protocols, such as the AppleTalk Update-based Routing Protocol and the upcoming AOCE (Apple Open Collaboration Environment). Future gateway software from Novell will let Macs access NetWare 4.0 directories and AOCE directories in the same way.

Meanwhile, Novell is working to integrate NetWare with the Mac client environment. To that end, the company next month will ship the MacIPX protocol stack. Once MacIPX is available, an application programming interface will be published to let developers build IPX (Internetwork Packet Exchange)-based services for the Mac.

Eventually, Novell plans on Macs logging onto the NetWare network rather than an individual server and getting the same set of NetWare 4.0 services as DOS or Windows clients without needing a special NLM. For this to work, future "browser" software may replace the Chooser for client access to NetWare, said Steve Nelson, a general manager for Novell's NetWare client group.

Nelson said the native Mac and AOCE support are slated to be ready in the first quarter of 1994. □

Third parties upstage Apple at Interop

Aside from a glimpse at current and future versions of NetWare, Mac network managers will find a variety of offerings at this week's Interop 93 Spring.

Apple, however, will confine itself to a place in the AppleTalk Solutions Showcase hawking its recently shipped Apple Internet Router 3.0.

In the same booth, Rochester, N.H.-based Cabletron Systems Inc. will demonstrate AppleTalk over Fiber Distributed Data Interface (FDDI) with its F6069 NuBus adapter cards and FDDI concentrator. Cabletron also will show AppleTalk Remote Access (ARA) support, which is due this summer for the company's 16- and 32-port concentrator cards.

A traditionally non-Mac vendor, SysKonnect Inc. of Saratoga, Calif., will enter the Mac arena by announcing three versions of FDDI NuBus cards for fiber and shielded or unshielded twisted-pair wiring.

Asanté Technologies Inc. of San Jose, Calif., will show off its mini-ENSC, a pocket-size Ethernet SCSI adapter for the PowerBook that is smaller and slimmer than either the company's or Dayna Communications Inc.'s external adapters.

As promised, Cayman Systems Inc. of Cambridge, Mass., will introduce and this month ship software Version 1.1 for GatorLink, the company's three-port ARA server. The upgrade has support for ARA's dial-back security feature, the capability to set per-user and per-server connection time limits, and will be able to restrict some network broadcast traffic from going out to remote users. — *By April Streeter*

Symantec

From Page 1

fines of up to $210,000.

The case began last fall when Scotts Valley, Calif.-based Borland found what it said were stolen documents in undeleted electronic-mail messages left to Eubanks in Wang's corporate MCI Mail mailbox after he abruptly quit to join Symantec, based in Cupertino, Calif.

The Santa Cruz County district attorney's office has been conducting a criminal investigation of the Symantec executives since Sept. 1, 1992, the day Wang joined Symantec. Two days later, Borland filed a civil lawsuit against Eubanks and Wang. The complaints claim Wang stole trade secrets from Borland, including long-term business plans and forthcoming products.

Trade-secret disputes are not uncommon in Silicon Valley, but they are usually handled in civil — not criminal — court, said Jeffrey Kingston, a computer law attorney for Probeck, Phleger & Harrison in San Francisco. "This is definitely a precedent-setting case," he said.

"This case is a significant first because of the kind of evidence and issues presented," said Santa Cruz County District Attorney Art Danner at a press conference last week. "What's at stake is the definition of the law regarding the use of trade secrets and an employer's computers."

Danner declined to comment on the evidence against Eubanks and Wang. He said some of the evidence and part of the trial may be presented in closed court to protect Borland secrets.

He did say the case hinges on a California law designed to prevent employees from accessing their companies' computers, without authorization, to steal information.

In fact, the indictment reads like a network administrator's user-activity log. Each alleged theft and delivery of stolen information is identified as having occurred at a specific minute of the day.

Shari Steele, a staff attorney for the Electronic Frontier Foundation in Washington, D.C., said Eubanks' and Wang's attorneys may file an invasion of privacy lawsuit against Borland and the district attorney's office for their confiscation of Wang's E-mail messages. The federal Electronic Communications Privacy Act and California law prevent reading of messages sent over public E-mail systems, such as MCI. Borland CEO Phillipe Kahn has said his company was justified in doing so, since it owned and paid for Wang's MCI account.

"We're confident that anything that was seized was seized legally," Danner said. He would not comment specifically on Wang's right to privacy under the ECPA.

The actual definition of a trade secret may also come into play. Eubanks' attorney, Allen Ruby of the San Jose, Calif.-based law firm of Morgan, Ruby, Schofield, Franich and Fredkin, hinted that even if it is proved that messages were passed between his client and Wang, he will challenge the assertion that they included trade secrets. California's law prohibits the exchange of technical and scientific information, but not business secrets. A second major issue will be the motion by Borland and the district attorney's office to seal most of the evidence in the criminal case.

Ruby said the sealing of the evidence threatens his ability to defend Eubanks and the court's ability to try the case fairly. "The role of Borland in all of this is something that will be developed in open court," he said.

The case also further clouds Symantec's financial future. The company has lost $10 million the past two quarters, a result of what analysts call haphazard growth via acquisition. Now, Eubanks and Wang may not be allowed to travel on business, Danner said.

Eubanks last week steadfastly said the charges will not force him or Wang to leave Symantec. "I don't like to be a test case to find out what the law is," he said. "It hasn't helped my reputation, but the key issue is [that] I'm innocent."

But Danner took a hard-line stance at the press conference last week. "This is not some type of academic exercise; this is a serious legal case," he said. □

Jon Swartz contributed to this report.

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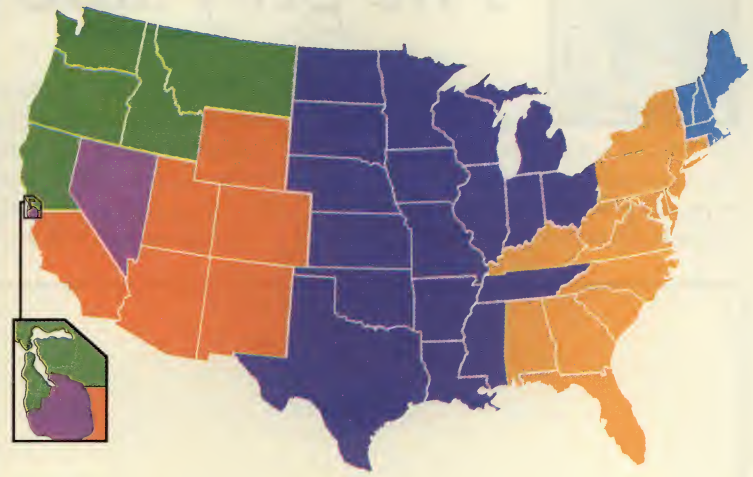

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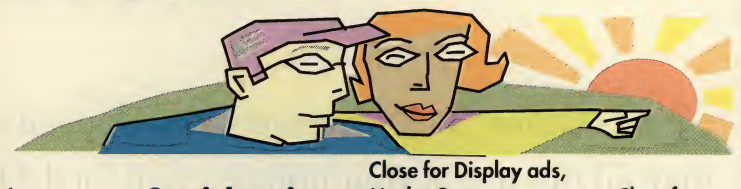

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The gray side of selling Macs

Tastes great, less filling. Raise taxes, cut spending. New Macs, no deliveries. All of these examples have one thing in common (in addition to perpetuating the myth that verbs are optional). Each serves to hide a complex reality.

We'll leave the easy issues of alcoholic beverages and government budgets for other columnists. We'll deal with yet another facet of the dynamics of why you often can't get the Mac you want when you want it.

On the surface, it all seems so simple. Apple develops a hot new Mac, ramps up production, takes orders from anxious dealers, then announces its latest to a grateful market, which bellies up to the register with cash or equivalent in hand. This is sometimes called the fairy-tale scenario.

The reality scenario is that dealers are so squeezed by the twin forces of customer demand for discounts and Apple's shallow margins that many have to move inventory to the gray market after only two or three weeks. And that, dear reader, is why your local gray-market advertiser seems to have more scarce inventory available than your favorite authorized dealer.

Everything will be better. That's one you've just gotta believe. And in fact, many of the shortages that have plagued would-be purchasers have eased up dramatically in the past few weeks. Of course, Apple has many new products in the pipeline that could easily throw us back to the bad old days of supply malaise if production can't be tooled up fast enough. Interest in the Cyclone, the darling of the multimedia crowd, is building already. The Knife reports that Apple is considering offering upgrades for Centris 610s and Quadra 800s to Cyclone level, just as it currently offers upgrades from the IIvx to the Centris 650.

Those who whine every time Apple introduces a new Mac with a better price/performance ratio than the one they just bought can consider this an advance warning.

Yugo Mac. An exclusively high-end strategy serves no company, and Apple is no exception. For those who insist on spending the smallest amount possible on a new computer and still having genuine Mac ROMs inside, Apple is readying a supercheap Mac for introduction this summer, well in time for the Christmas selling season. No effort will be spared to lower the production cost of this model. Sources claim there's an excellent chance that this will be the first Mac ever with a manual floppy disk eject button, a feature that will surely shave entire cents off the bottom line.

Other neat features will be support for a VGA monitor, 2 Mbytes of RAM standard and the absence of a SCSI port. All this fancy technology will be driven by a 16-MHz '030. Think of it as a stripped LC II.

Just call me. Duo owners may have thought that their problems were over when Apple finally began shipping the Express Modems, but things have taken a decidedly unpleasant turn. The first version of the required software needed a fast upgrade, as most Express users quickly discovered.

Since Apple had no tracking mechanism in place, it has been up to the customers to contact tech support to inquire about the update. You can imagine the surprise of some of them when the otherwise helpful Apple tech-support person informed them that the patch was available for downloading on AppleLink. Now, electronic distribution of software patches is usually a good idea, but this method poses a bit of a problem for those whose modem isn't functional. Apple's false start with the Express Modem should help ease the introduction of the third-party alternative that's expected to ship shortly. □

You don't absolutely need a modem to get a MacWEEK mug, but it couldn't hurt. If you have both the functional means and the proper currency, call the Knife at (415) 243-3544, fax (415) 243-3650, MCI (MactheKnife), Internet (mac_the_knife@macweek.ziff.com),. AppleLink (MacWEEK) and CompuServe/ZiffNet/Mac.

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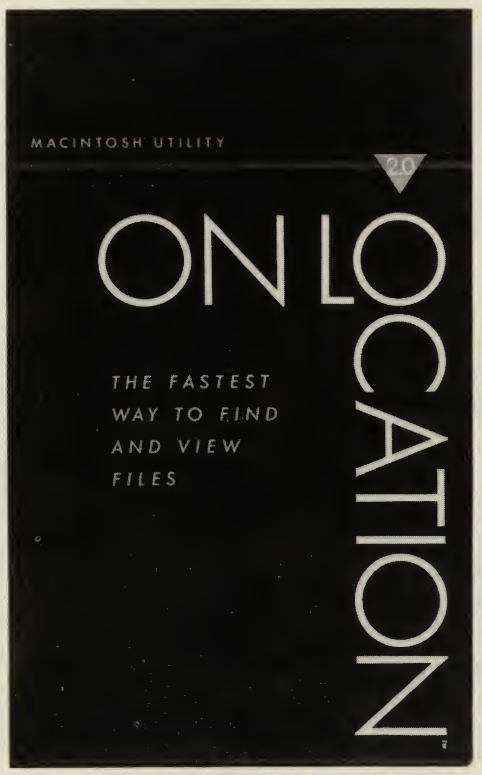

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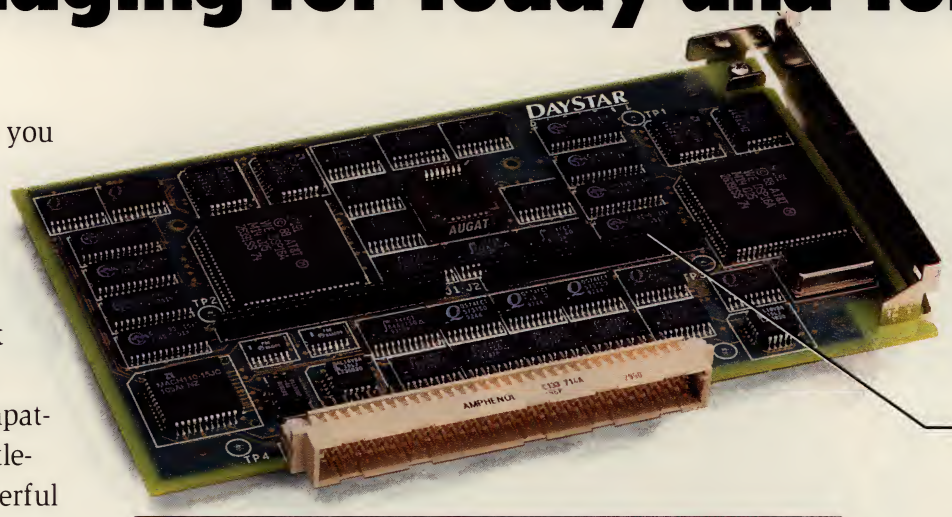

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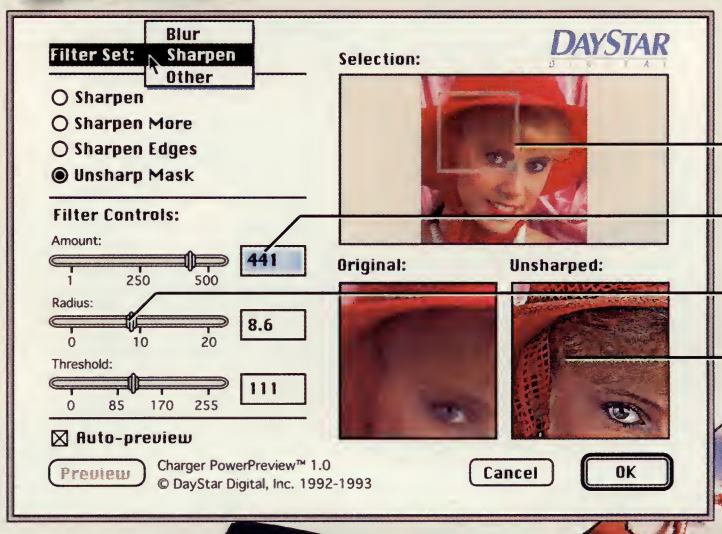

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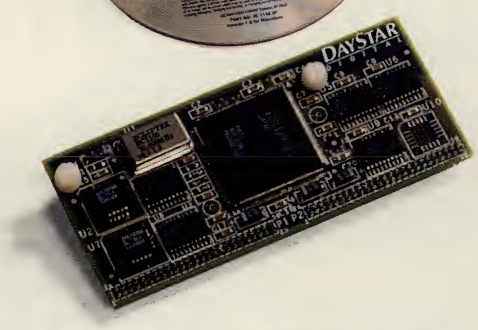

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